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METHOD OF THE RECITATION

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THE METHOD

OF

THE RECITATION

BY

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PREFACE.

THE Method of the Recitation has sprung out of school-room work, and is designed to be a practical application of the principles of method to the various problems of class-room instruction. It is an effort to bring together and to organize the various principles that control skillful teaching.

It is based fundamentally upon the inductive-deductive thought movement in acquiring and using knowledge.

This organized plan of laying out recitation work was first projected by the thinkers of the Herbart school in Germany. For more than thirty years they have been developing and applying it under the title "The Formal Steps of Instruction" (*Die formalen Stufen des Unterrichts*). Formerly Dr. T. Ziller at Leipzig was a leader in the movement, and more recently Dr. W. Rein at Jena. They worked out their theory and applied it with proficiency to a large variety of topics in different studies, thus showing the flexibility of leading principles under various forms of application.

The Method of the Recitation is based upon the principles of teaching which were expounded and illustrated in the work of Herbart, Rein, and Ziller. At the same time, the authors hope to have shown in the body of the work that we have to do here with principles recognized by teachers in every land, and that there is no thoughtless imitation of foreign

methods and devices. While our debt to German thinkers for an organization of fundamental ideas is great, the entire discussion, as here presented, springs out of American conditions; its illustrative materials are drawn exclusively from lessons commonly taught in our schools. In fact, the whole book, while strongly influenced by Herbart's principles, is the outgrowth of several years' continuous work with classes of children in all the grades of the common school.

The Method of the Recitation may be regarded as Part II of the broad subject of Method of which the "General Method," published earlier, is Part I. The latter book is a discussion of the leading principles of education as they bear on the school curriculum, and is designed to be preliminary to the definite treatment of recitation work.

The final test of the value of any such effort to organize the recitation must be found in the worth of the actual lessons worked out in accordance with its principles. Two chapters, II and XI, are given up to such typical lessons. Each topic or lesson unity treated requires several or even many recitation periods for its completion.

The authors have divided the field nearly equally between them, Chapters I, II (except the illustration Unity is Strength), VIII, XI, except the parable of the tares, XII, XIII, XIV, and XV, being written by C. A. McMurry. The illustration, In Unity is Strength, of Chapters II, Chapters III, IV, V, VI, VII, IX, X, and the parable of the tares in Chapters XI, were written by F. M. McMurry.

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CHAPTER I.

VARIETY VERSUS UNIFORMITY IN THE METHODS OF INSTRUCTION.

THERE has been a long-standing dispute among teachers whether or not the processes of instruction must conform to any fixed and uniform regulations. Among scholars, and even among teachers, many have been skeptical of anything like a definite science of education.

At the first glance, the broad field of education presents a medley of varieties—many and varied studies, children of all ages and capacities, and teachers of nearly every quality and description. There are many sorts of schools, and great diversity of purpose and method even in schools of the same kind. In high schools, for example, there are general and business courses, classical and scientific courses, but teachers are at variance as to the best methods of instruction even in the classical course, to say nothing of the different standpoints of teachers of classics and of natural science. What is still more discouraging, the very sciences upon which pedagogy claims to be based, psychology and ethics, lie as much in the field of controversy as pedagogy itself. Confused by this endless variety and fluctuation in the theory and practice of teaching, it is not strange if many scholarly people, even teachers,

take a skeptical attitude toward scientific method. Instead of following uniform processes of teaching and of learning, each person is regarded as a law unto himself.

This tendency to discredit a science of education is indicated by our use of the term *method.* There is scarcely a more common word in the teaching profession, and it is frequently employed in the plural form, a practical admission not of one and only one right method, but that their number is legion. Also some of the most common watchwords of our profession point in the same direction, "Freedom and originality," "The teacher is born, not made," "Make your own method."

Our pedagogy seems to have fallen into a condition similar to that in which philosophy found itself in the time of the Sophists. Each man's judgment was counted as good as another's. Each man was the measure of all things, and though two men differed radically, both might be right in their judgments. The Sophists were skeptical of any universal standard of truth. Socrates, who followed them, sought in the individual's thinking, when properly guided, a universal principle of truth, so that all men when they think logically and soundly must agree. He was in search of a uniform mode of thinking which would have universal validity. Pedagogy likewise is in search of universal principles of method in learning, based not upon the subjective whim of the teacher, but upon the common law of mental action which is universal with all children and students.

The question is this: Is there any essential, natural process upon which a uniform method of treating the varied school subjects can be based? As already said, to outward appearance there seems to be no such process; there seem to be no principles that may serve as a guide for all persons in teaching all subjects. But we should not be discouraged by appearances. The fact that even good teachers show an infinite variety of individual and personal traits, and that studies differ greatly in subject matter is no proof that there is not a common mode of procedure for instruction. We remember that everywhere in nature and in society is variety and apparent confusion; fundamental laws do not stand out so as to be easily detected by careless observers. They lie deep and must be searched out by patient examination and labor. In the study of trees and flowers no scientist is deceived by the multiplicity and variety of living forms. It is the habit of his mind to reduce all varieties to common structural forms and simple classes.

Hence, while there is, no doubt, a large element in teaching that is always variable, according to the study and the personality of teacher or pupils, is there still no type form of which these are the variations?

Is there no essential uniformity, are there no great underlying principles of method? Could they be discovered no one would deny their value; we are not so enamored of individual freedom as to refuse submission to rational, regulated processes.

Definite and valuable principles of action, while they check one's freedom along foolish lines, guide effort into the channels of efficiency. Too much freedom becomes positively oppressive. Whether traveling over a continent or through a field of thought, erecting a mansion, or developing a high moral character, whoever would keep his bearings and work forward to an important end, must have a guide. Whether it be a compass, a model, or an ideal, he must look to it continually for direction. Any one engaged in a work so important and difficult as teaching is much in need of fixed principles which outline for him the ideal of method. If convinced that no one method is right, that no ideal can be set up, he is like a sea-captain who is persuaded that whatever course he may choose for his vessel is at least possibly good. He acknowledges the possession of no standard of excellence, and sees chiefly fog in his chosen course. He is subject therefore to half-hearted action, for energy and encouragement are not born of uncertainty and confusion.

No one, therefore, will object to a considerate effort in searching for the unity that may lie under the variety of good methods in teaching.

Our text-books seem to supply us with the most definite formulation of methods of teaching that we have. They are generally constructed out of the experience of the better teachers and in conformity with those traditional ideas and practices which are common to the great body of instructors. The examination and comparison of our most widely-used

text-books in grammar, arithmetic, history, geography, and reading will show a uniformity in at least one very important respect.

It may be said that our text-books in English grammar are built on a single plan. As surely as an ordinary dwelling has parlor, sitting room, and kitchen, so grammar has orthography, etymology, and syntax. This is one kind of uniformity, namely, that of leading topics in the subject matter. But what is more important is the fact that the general truths contained in these materials are singled out as the central aim of study. In grammar everything culminates in the definitions and rules whose complete mastery gives us the scientific grasp of the structure and meaning of language. In most books even the method of reaching the rules and definitions is stereotyped. Definitions, examples, and applications constitute the regular order in the treatment of every topic. Green's grammar is an illustration. Some of the more recent books have modified the order of general truths and have adopted an inductive method of treatment, but under all changes, the definitions and principles expressing the functions of the parts of speech and the syntactical relations of the elements of the sentence, have remained the central aim of instruction.

An examination of a score of the best arithmetics in use will show a striking uniformity in the series of important topics treated. The following series is very familiar; the four fundamental operations, factoring, common fractions, decimals, compound numbers, percentage, ratio, proportion, involution,

and evolution. But this external uniformity of subject matter is only a sign of that deeper-lying uniformity which aims at the development and use of fundamental principles. The elementary general truths of arithmetic lie at the basis of all the important topics handled. The solving, analysis, and explanation of problems are simply means for bringing the important principles clearly to light. When the principles can be explicitly stated and intelligently applied the essential aim of arithmetic has been reached. In most books even the method of procedure in mastering the rule is the same, first one or two simple problems worked out and explained, then the rule followed by a series of applications, growing more complex and difficult.

In algebra and geometry the essential principles which constitute the framework of these studies are still more strikingly prominent as the aim of study. While the methods of approach to principles vary somewhat, the definitions, theorems, and propositions, when finally reached, are formulated in nearly the same language.

In mathematics, therefore, as in grammar, instruction centers in the principles to be understood and applied. All variations in method, whether inductive or deductive, are different modes of presenting these generalizations.

A comparative study of the leading common-school geographies will show a similar agreement in aim. No study is richer in the abundance and variety of concrete material than geography, but the books follow a strong traditional tendency and

are really modeled on a single plan. Not only the outline of leading topics is the same, such as mathematical geography, physical features of the continents, the political divisions and populations, the chief occupations, as agriculture, commerce, mining, and manufacturing, but in these topics the chief purpose is to give a distinct emphasis to the general truths which underlie all the variety of geographical detail. We are made unpleasantly conscious of this generalizing tendency of geographies by the large number of general statements in all the books. Some of the newer books appear to depart somewhat from this plan, but nearly all the old ear marks, familiar to geographers, are in plain sight and show themselves, especially in the broad statements which summarize important general truths. Each new book is only a modified dressing up of the same familiar skeleton outline of elementary truths.

In the three studies, therefore, as widely different in subject matter as grammar, arithmetic, and geography, we find this tendency to concentrate effort upon the mastery of essential general truths predominant. What is the basis of this uniformity in the studies named? Is it simply blind custom, or have we been working out, consciously or unconsciously, a fundamental principle in education? All the text-books have formulated the important general truths, and have arranged them in a certain order or system. In short, this uniformity has been based upon the nearest approach to the scientific statement and arrangement of general truths that each of the studies would permit. Consciously or

unconsciously, the text-book makers have been controlled by a fundamental principle. While we have talked glibly about freedom and originality in teaching, the text-books have held the great majority of teachers in a well-defined routine. To all practical purposes we have been doing the same things, and doing them in much the same way.

In spite of its tiresome sameness, this uniformity may be found to contain an element of great strength, namely, the focusing of thought upon the essential principles of any study. This concentration of the labors of both pupils and teachers upon the general truths has established a crude, yet strong, framework for both material and method in all the studies.

There are seeming exceptions among studies to this movement of instruction toward the general and systematic forms of truth. Some text-books seem to aim at valuable instruction without apparently dealing with general truths. History, for example, has the appearance of working with the particular rather than with the general statements of truth. In reality it consists largely of brief, summarizing propositions involving the meaning of important events, or of political and social movements. They are stripped of almost all concreteness and individual detail, and approximate the general ideas illustrated by such materials. In history every important event is typical or representative in character, setting forth a truth common to many other events, or reappearing in the lives of many persons. In Hamilton's life and thinking as a statesman the notion of a strong central power

in government was potent. This idea appears, also, in other statesmen, as in Webster, Washington, and Lincoln, and has gradually become an idea common to all patriotic Americans. The building of the old national road was a particular event, but it illustrated the principle of the right of the federal government under the constitution to make internal improvements. So every event in history, that is worth learning, points the way to a more general truth. History, therefore, when examined more closely, has a large number of general truths in store, and it is the deeper, broader meaning of these general ideas which we seek, through particular events, to disclose.

There are a few studies, like reading, writing, and spelling, in which the mastery and use of arbitrary symbols play an important part, where the rules and statement of principles are reduced to a minimum. But even here there is a small nucleus of rules upon which the study is organized, as in the general requirements for securing good oral expression in reading, in the rules for spelling and in the directions for acquiring good writing habits.

The underlying sameness that marks each large class of text-books is one of the most noticeable characteristics of our education, and is in clear contrast to that variety of methods discussed at the beginning of this chapter. Education gravitates into these channels of generalized knowledge as surely as rivers work their way through the lowlands. Even in a democratic state where each community is free to adopt its own system and method

of education, where no hierarchy of learned men in any way officially directs the educational policy of the state, we see an almost universal tendency toward uniformity, based upon the broad scientific principles of any study.

If now we find that the ground for this uniformity is really a scientific idea, not only widely recognized but valid in psychology, we may fix a starting point for a sound pedagogy. The mastery of the central truths of a study must remain the direct purpose of instruction in each branch of knowledge. These truths are what are known in psychology as general notions or concepts. They are the centers around which the knowledge of any subject is grouped and classified. It is the mastery of these rules and principles and the ability to apply them that are constantly aimed at in all the best school work.

From an examination of our psychologies we shall detect that the percept and the concept (the particular and the general notion) find a universal recognition. Inductive and deductive thinking, as recognized in all the philosophies, have set the general notion at the center of all thinking as the thing aimed at in induction and as the starting point in deduction. We find, therefore, that the general notion is a pivotal center both in psychology and in pedagogy.

It is not claimed that the method by which general notions have been worked out in our text-books is uniformly correct and valid. This is a question we are not called upon to settle at this point.

Whether or not an inductive or deductive approach to general truths is the correct one we can leave for further consideration. But the final aim of instruction in every important study is a mastery of its general truths. Without this basis no method of instruction has any validity. It may be that the method by which this aim can be best approached and realized has been so thoroughly misinterpreted and misapplied that we have had a general uniformity of error in our methods of teaching. It may be that definitions and abstract formulæ have been set too much in the forefront of every lesson topic, and also that systematically formulated knowledge has been forced prematurely into lower grades. Yet it is a great step in the right direction to have fixed clearly the aim of instruction, to have determined the goal toward which all proper mental movement tends. With this conclusion firmly established we may move on to a discussion of the essential steps in a correct method of instruction.

CHAPTER II.

Illustrative Lessons Showing the Processes of Reaching General Truths.

IN the first chapter, having located the goal of instruction in general notions and in their proper use, the question, how to reach them, now becomes paramount. In the present chapter a number of lessons is worked out to illustrate the different processes in vogue for mastering general truths. In each example, two different methods are presented; first, that common to most of our text-books and to the usual practice of teachers, and second, the fuller inductive and developing method now followed in some schools.

The purpose of this chapter is not only to show the two ways of reaching a comprehension of such truths, but also to illustrate important phases of recitation work. In the discussions of recitation method which follow, these lessons may be kept in mind as illustrating the principles under treatment.

The lessons are taken from different studies,—arithmetic, geography, natural science, literature, and history. They recognize generalizations as the goal of instruction, but leave open the question as to whether or not any common principles of method

may be found in the treatment of these various materials.

The Addition of Fractions.

In first learning to add fractions, the method of the arithmetics is fairly illustrated by the following:

What is the sum of $\frac{9}{13}$, $\frac{1}{13}$, and $\frac{10}{13}$?
Process: $\frac{9}{13}+\frac{1}{13}+\frac{10}{13}=\frac{9+1+10}{13}=\frac{20}{13}=1\frac{7}{13}$.

What is the sum of $\frac{1}{16}$, $\frac{3}{16}$, $\frac{7}{16}$, and $\frac{7}{16}$?

What is the sum of $\frac{5}{8}$, $\frac{7}{12}$, and $\frac{11}{16}$?

Process:
$\frac{5}{8}+\frac{7}{12}+\frac{11}{16}=?$
$\frac{30}{48}+\frac{28}{48}+\frac{33}{48}=\frac{91}{48}=1\frac{43}{48}$.

Since unlike fractional units can not be added, reduce the fractions $\frac{5}{8}$, $\frac{7}{12}$, and $\frac{11}{16}$, to a common denominator and then add the resulting fractions.

After ten or a dozen problems the following rule is given:

"To add fractions, reduce the fractions to a common denominator, add the numerators of the new fractions, and under the sum write the common denominator."

The following more detailed process is suggested for consideration:

How shall we add fractions whose denominators are un like?

What fractions have you already learned to add? Try these, $\frac{1}{3}$ and $\frac{2}{3}$. $\frac{3}{5}$ and $\frac{2}{5}$. $\frac{7}{13}$ and $\frac{12}{13}$. Can you add $\frac{1}{2}$ and $\frac{1}{3}$? What change is necessary before adding them? Why not add them in the same way as the others? How can you add one bushel and one peck? Change the bushel to pecks. Add two yards and one foot. What change was necessary in both examples? Add $\frac{1}{4}$ and $\frac{1}{8}$. $\frac{1}{4}=\frac{2}{8}$. $\frac{2}{8}+\frac{1}{8}=\frac{3}{8}$. Illustrate this with a square divided into fourths and eighths. Add $\frac{3}{8}$ and $\frac{4}{16}$. Add $\frac{1}{2}$ and $\frac{3}{4}$. What was done in all these cases before adding?

How shall we add $\frac{1}{3}$ and $\frac{1}{4}$? How can you change the two fractions so that they will be alike, that is, have the same fractional unit? Change them to twelfths. One-third equals how many twelfths? One-fourth equals how many twelfths? $\frac{1}{3}+\frac{1}{4}=\frac{4}{12}+\frac{3}{12}=\frac{7}{12}$. Illustrate this with a sheet of paper folded into thirds, fourths, and twelfths.

Add $\frac{2}{5}$ and $\frac{1}{2}$. What is the common fractional unit?

$\frac{1}{10}$ or $\frac{1}{20}$. $\frac{2}{5}+\frac{1}{2}=\frac{4}{10}+\frac{5}{10}=\frac{9}{10}$.

$\frac{3}{4}$ and $\frac{3}{10}$=? $\frac{3}{4}+\frac{3}{10}=\frac{15}{20}+\frac{6}{20}=\frac{21}{20}=1\frac{1}{20}$.

Notice, now, what was done in each of these problems; $\frac{1}{3}+\frac{1}{4}$, $\frac{2}{5}+\frac{1}{2}$, and $\frac{3}{4}+\frac{3}{10}$. The fractions in the first were changed to twelfths, in the second to tenths, and in the third to twentieths. Was the value of the fractions changed? But in each example the fractions were changed to a common fractional unit, or a common denominator. What was done to the numerators? In each fraction they were changed to correspond with the change in the denominator. Then in adding, the numerators were added.

Make a rule for adding fractions that will cover all the cases so far worked:

"To add these fractions, change the fractions to equivalent fractions having a common denominator: Add the numerators for a new numerator and use the common denominator for the new denominator."

To acquire skill and accuracy in this kind of addition:

1. Add oral problems as follows:

$\frac{1}{5}+\frac{1}{3}$. $\frac{7}{8}+\frac{3}{4}$. $\frac{5}{12}+\frac{5}{6}$. $\frac{4}{5}+\frac{7}{12}$.

2. For written work add such as these:

$\frac{13}{16}+\frac{15}{17}+\frac{59}{81}+\frac{2}{3}$=? $\frac{9}{10}+\frac{13}{14}+\frac{7}{15}+\frac{17}{16}$=?

3. Add mixed numbers as follows:

$32\frac{5}{6}+17\frac{9}{10}+18\frac{3}{16}$=?

TRADE CENTER IN THE NORTHWEST—MINNEAPOLIS AS A TYPE.

This topic may be treated in two ways, briefly, as in the geographies, or in a fuller, inductive manner. One of our latest grammar school geographies says:

"Minneapolis, which adjoins St. Paul, so that the two are called the 'Twin Cities,' manufactures more flour than any other city in the world, its capacity being 40,000 barrels a day. The two cities have had a remarkably rapid growth."

Tilden's Commercial Geography, which is very much fuller on this topic than the regular geographies, says:

"Minneapolis, on the Mississippi at the Falls of St. Anthony, is the greatest flour-milling city in the world, and one of the greatest lumber markets and lumber-manufacturing centers in America. The yearly output of the flour mills is nearly 10,000,000 barrels. Of this about one-third is shipped to foreign countries, constituting about one-fourth of the total flour export of the United States. In manufacturing this flour the Minneapolis mills grind about 45,000,000 bushels of wheat annually. The Pillsbury 'A' mill is the largest flour mill in the world, having a daily capacity of 7,500 barrels. The saw and planing mills of Minneapolis have an annual output of the value of $10,000,000, and the lumber is manufactured into barrels, boxes, cars, wagons, and many other products, aggregating a value twice as great. In the decade 1880-'90, the population of Minneapolis increased nearly fourfold."

The following is a much fuller treatment of Minneapolis in its important relations to the Northwest, such as would require several recitations:

We will inquire into the causes which make Minneapolis an important city.

Where is it and what have you heard about it? Why is it sometimes called the flour city? What is meant by the "Twin Cities?" Recall Hennepin's trip on the Upper Mississippi and what you know of the Falls of St. Anthony. Can you tell something of the wheat fields and pineries of Minnesota? Of Minnehaha Falls and the lakes of the North?

St. Paul was an important trading point and the capital of the state before Minneapolis had a beginning. Why should Minneapolis spring up only ten miles away and soon become larger even than St. Paul? The great water-power of the falls is the first answer. How can water from a river be used to run a mill? Where have you seen a mill run by water-power? Describe the water-wheel, the dam, and mill-race. At Minneapolis the water is carried by a channel on the west side of the falls under the great mills where it drops forty feet to the large turbine wheels at the bottom, turning them and with them all the machinery of the mills.

Along the Upper Mississippi and its branches in northern Minnesota are large pine forests. How could the pine logs be brought to the saw mills at Minneapolis? Some of the early settlers moved northward into the pineries, cut down the trees in winter and sent them floating down the streams to the saw mills at Minneapolis.

Soon large lumber companies were formed with big saw-mills at the Falls, and owning extensive pine lands in the North. In the winter time they sent scores of men to the logging camps to get out the logs and float them down in spring time to the mills. With the mills at Minneapolis came the families of the mill companies and of the workmen, and thus a flourishing town sprung up at the Falls. Great lumber yards with their stacks of boards stretched along the river. Some of this lumber would be used in building up Minneapolis, but where would most of it be sent? The farmers were rapidly settling up the prairie regions of the Northwest. Locate these prairies on the map. In what directions from Minneapolis would most of this lumber be sent? For two or three hundred miles to the west, southwest, and northwest from Minneapolis the whole prairie land was rapidly

taken by settlers. How could this lumber be gotten best to the new farms and villages? At first wagons were used, but soon railroads were built across the prairies, from St. Paul and Minneapolis, and car-loads of lumber were sent out to the towns and distributed by merchants to the farmers. As the lumber business grew the whole Upper Mississippi with its tributaries became a network of streams and logging camps collecting logs for the mills at Minneapolis. Closely connected with the saw mills were the planing mills for preparing dressed lumber, sash, doors, mouldings, etc. Factories were also built for the manufacture of furniture, barrels, wagons, and agricultural implements. All these products were distributed by the railroads over the broad prairie regions of southern and western Minnesota, Iowa, the Dakotas, and Nebraska. In short, Minneapolis, by reason of its favorable position on the river and its water power, soon became the chief center of the lumber business of the Northwest, collecting logs from the pine lands of the North, working them up into lumber, furniture, etc., and distributing them to the broad area of prairie states.

How would the prairie farmer pay for the lumber and other goods coming from St. Paul and Minneapolis? What is the leading crop of the Northwest? It was soon found that the prairies were well adapted to the growth of wheat and other small grains. In a few years the prairies, with the rich valley of the Red River of the North, became one of the largest wheat-producing districts in the world. How would the farmers get their wheat and other grains to Minneapolis? The water-power at the Falls was soon found to be more valuable for flour mills than for saw mills. In the lumber mills the sawdust supplied abundance of fuel for the furnaces, so that they did not need the water-power, and hence the latter was used for running the great flour mills that were now built at the Falls. The same railroads which distributed lumber to the prairies collected the wheat. In 1871 only two carloads of wheat were received in Minneapolis. In 1887 the Great Western road alone brought 33,000,000 bushels of wheat to the elevators at Minneapolis. In 1896

250,000 barrels of flour were ground here in a single week. In what directions would this immense quantity of flour be shipped and marketed? What lake ports would receive much of it for shipment by water? Notice on a railroad map the important railroad lines from the Twin Cities to Duluth, Milwaukee, and especially Chicago. Much of this flour is shipped to Illinois, Ohio, etc., much to Pennsylvania, New York, and New England, and whole cargoes to Liverpool and Hamburg.

Minneapolis has become a center for the collection of enormous quantities of wheat from the wheat regions of the Northwest, for its manufacture into flour, and for its distribution by railways and waterways to the large populations of the Middle and Eastern States and to Europe. The flour business, like lumbering, has brought a large population and increase of business to Minneapolis.

There is still a third line of business in Minneapolis as important as the two already mentioned. What goods from the Eastern States are shipped into the two cities for sale and distribution over the Northwest? Dry goods, wholesale groceries, machinery, drugs, china and porcelain, glass, hard ware, tools and instruments, books and paper, and hundreds of other products of eastern factories and mills as well as those from Europe are shipped to the Twin Cities to be distributed over the Northwest. Sum up in a single statement the three important lines of traffic which have given Minneapolis its importance as a trade center.

Passing down the Mississippi in a steamboat from St. Paul, we notice at Wabasha, Winona, and LaCrosse, at Dubuque, Davenport, and Rock Island, great saw mills and lumber yards even as far as St. Louis. An inquiry into the causes will show that the St. Croix, the Chippewa, and the Black rivers are lumber streams bringing from the pineries of Wisconsin great numbers of log-rafts to the mills of all these cities. The railroads extending westward into Iowa, Minnesota, and other states, carry the lumber from these river cities to the prairies. Large flour mills are also found at most of these cities where wheat is received from the regions on the West, is milled and sent eastward as flour.

Compare now these cities along the Upper Mississippi from Minneapolis to St. Louis, note how they differ in size, location, and importance. Note also whether they are alike. Compare them as (1) to having sawmills, and as to where the logs come from. (2) Compare them as to the manufacture of flour and the sources of the wheat. (3) Compare them as centers for the wholesale trade in goods manufactured in the East, and (4) as to advantages for river trade north and south, and railroad traffic east and west.

As a result of this comparison sum up the character of all the cities of the upper Mississippi as trade centers. Like Minneapolis they are all centers for the lumber business, receiving logs from the pineries, working them up into lumber, and distributing them to the prairies. They collect wheat from the West, mill it, and distribute it to the East. They are also centers for the wholesale trade in manufactured goods. In short, the whole upper Mississippi river, with its cities, forms one great link of communication between the pineries on the North and the prairies of the West, and also, by means of railroads and lakes, between the populations of the East and of the Northwest. Minneapolis is the chief representative and type of this whole series of cities on the Upper Mississippi river.

But let us inquire if there are other important centers of the lumber trade besides the cities of the Mississippi. Locate such cities on the Great Lakes, as Chicago, Milwaukee, Saginaw, Detroit, Buffalo, Cleveland. Show where they get lumber and in what directions it is sold and delivered. The Great Lakes are found to be in the midst of extensive pineries, while the cities mentioned are the trading points for collecting and distributing lumber southward to the large populations of the Middle States. What advantages has the city of Albany, N. Y., for the lumber trade? Canals connect the Upper Hudson at Albany with Lake Champlain, Lake Ontario, and Lake Erie. What advantage do these canals offer for the lumber trade? What cities of Maine and New Brunswick are noted for lumbering? Where do they get the logs, and how and whither is the lumber distributed?

What other cities of the United States are important for trade in wheat and flour? What other cities of the United States are located, like St. Paul and Minneapolis, at the head of steamboat navigation on important rivers? Are any of them noted for their water-power? What raw products are collected at Pittsburg? What are its factories? Compare Pittsburg and Allegheny with St. Paul and Minneapolis, in advantage of location, as trade centers for great staple products, in manufactures and in population.

In future geographical study the city of Minneapolis and the group of cities on the upper Mississippi, of which it is the special type, may serve as a standard of comparison in measuring the commercial importance of other large trade centers.

Wisdom Better than Gold.

In bringing moral ideas to the attention of children, many teachers begin with some general statement or proverb, which serves as a text for the lesson. If the teacher's purpose is to bring out the idea of a selfish love of money and its evil effects, such a proverb as "How much better it is to get wisdom than gold," or "The love of money is the root of all evil," is selected. Remarks are made upon the truth of the proverb, and simple illustrations of the evil effects of the excessive desire for money are presented. According to the same method we have a number of books designed for moral instruction, which contain short treatises or sermons on points of moral conduct. These are read to the school, commented upon, and perhaps further but briefly

illustrated. This plan seems to many persons a short and easy way of presenting moral truths to children.

Quite a different process of getting at a moral truth is illustrated by the use of the story of "The Golden Touch," in *Hawthorne's Wonder Book.* Here we have simply a classic story full of interesting personal detail, with no prominence at first given to the moral idea embodied in the story. Toward the end of the narrative the moral idea may be keenly felt, though not expressly stated in words. The contrast in these two methods of bringing out a moral idea is striking. The first method, described above, gives at the start dogmatic statement and prominence to the moral truth, while the method of the story gives only a hint, at the beginning, of the moral truth involved, but allows it to be developed incidentally in the course of the narrative. A few questions at the end of the story will bring out the moral idea with great clearness. This treatment is in its nature inductive, and, considered in detail, might take place as follows:

How a King Loved Gold and What Came of it.

Having so many things, why should kings wish for anything more? If you were a king what would you wish for most? What would you wish for now if you had your choice? We shall see in this story that a certain king was given his choice of the thing he most desired and what came of it.

Tell the story as given in the Wonder Book, (pages 55-60) which narrates how Midas came into possession of the Golden Touch. Let the children ask questions. Let the teacher answer as well as

she can and ask others to bring out the significant thoughts. The children should tell the story again till they acquire skill and ease in its reproduction.

The following questions are suggested:

What opinion have you of Midas in the dungeon, counting over his money? How might he have spent his time better? When Quicksilver gave him his choice, did Midas stop to think whether his wish was wise or not?

Tell the story of Midas while he had the Golden Touch (pages 60-70).

When Midas found that he had the Golden Touch how did he feel and act? When did he first discover that the Golden Touch was not entirely pleasant? How many times did he find out later that it was a cause of trouble? What were the worst things that happened to him because of the granting of his wish? How did Midas feel when he found out just what the magic touch meant? Could he help himself in any way? Did he have exactly what he had wished for? What had he that he didn't wish for and had not counted on? What could he have wished for better than the Golden Touch? How did he come to make such a mistake? If Quicksilver understood Midas' mistake at the first, why did he not tell him of his foolish choice? What would have happened if Midas had not been able to get rid of the Golden Touch? Was he really anxious to get rid of it? What reasons had he for being more anxious to be rid of it than he was in the first place to have it?

Tell the last part of the story (pages 70-74).

Did Midas waste any time in waiting to rid himself of his gold? How much gold did he throw away? When he had sprinkled his little Marigold and the roses back into life, in what respect was he worse off or better off than at the beginning of the story? Do you think he would spend much time in the future in the dungeon counting over his money? What lesson had he learned? He was a much wiser man than before.

Have you read stories before in which persons were given a choice of anything they might wish? Recall the story of Baucis and Philemon.

If the children are familiar with this story let them compare the choice of Midas with that of Baucis and Philemon and give reasons for thinking their choice a better one.

Why did they not choose gold as did Midas? By choosing wisely, what other good fortune did they receive? Recall also the story of Solomon and his choice. What did Solomon get besides what he asked for? Why was his choice more sensible than Midas's? Did Solomon have any reason for regretting his choice? How was it with Baucis and Philemon? Is it a good thing in choosing to prefer money or wealth before other things? What things are more valuable than money? In the stories referred to, what things prove most valuable in the end? What least? Recall Proverbs 16:16, "How much better it is to get wisdom than gold."

Do you know what a miser is? Of what value is money to such a person? What are some of the most valuable things that boys and girls may choose to-day? In the choice of friends and companions, is there much danger of making a mistake? Should wealth have much to do with it?

The usual social life of the school offers many opportunities for illustrating and applying such lessons as are found in the Golden Touch. The lessons in reading and history may also supply good comparisons.

The Metamorphosis of Butterflies—The Milkweed Butterfly as a Type.

One of the older zoölogies gives the following description of the order Lepidoptera, to which the butterfly belongs:

This well-known and most beautiful of all the orders of insects comprises the butterflies and moths, the former being active by day (diurnal) and the latter mostly by twilight (crepuscular) or at night (nocturnal). In all the Lepidoptera the mouth of the adult insect is purely suctorial and is provided with a spiral trunk fitted for imbibing the juices of flowers. The wings are four in number, and are covered more or less completely with modified hairs or scales, which are pretty objects under the microscope, and from which the wings derive their beautiful colors. The larvæ of the Lepidoptera are generally known as caterpillars. They are worm-like, provided with masticatory organs, fitted for dividing solid substances, possessing false legs in addition to the three pairs proper to the adult, and having attached to the under lip a tubular organ or spinneret, by which silken threads can be manufactured." (*Nicholson.*)

In the above lesson we have a verbal description of the whole class of butterflies, to be studied and learned by the student.

The following treatment of the milkweed butterfly is based upon the idea of observation by the children, questions, comparison of data, collections, and conclusions drawn from direct experience with the objects studied. The method of question and discussion can be indicated only in part:

Let us see first what you may have already observed of butterfly life

In your previous observations in the fields and roads, tell of the habits of those butterflies which you have seen, their

peculiar flight, whether they have been noticed on flowers or in damp places. What butterflies are you most familiar with? What is their food? Do you know what the butterflies come from? Have you seen the chrysalis of a butterfly and watched its change? What was its form before it became a chrysalis? Does it seem possible that a butterfly could come from a caterpillar? Have you noticed that certain butterflies prefer a certain kind of plants, and what the caterpillars feed upon? Do caterpillars grow larger and change?

For a closer understanding of the changes that take place in a caterpillar and in other forms we will follow the life and changes of the *milkweed butterfly* from the laying of the eggs to the full-sized insect in its later life. (Samuel H. Scudder's "Life of a Butterfly" will be very helpful to teachers in telling where and when to look and in explaining many facts derived from fuller scientific studies; published by Henry Holt & Co., New York.) The principal facts, many of which can be observed by teacher and children, are briefly told, as follows:

As early as April or later in summer the butterfly deposits its eggs (shaped like a sugar loaf, one-twentieth of an inch in height), on the under or protected side of the upper and tender leaves of the milkweed. The eggs hatch out in from three to five days, depending on the warmth of the weather As soon as the little caterpillar gets out of the egg it turns and eats the shell, and then begins to feed on the green leaf of the milkweed. It is a great eater, and as its food is always at hand it spends most of its time eating and resting, day and night. (Let the children notice these facts as far as possible, and observe whether it is careful to stay on one side of the leaf.) In a day or two after hatching, the caterpillar makes its first *moult*, or sheds its skin. It grows so fast that its skin splits off and it comes out in a new, shining coat. Three other moults follow before it reaches its full growth, lasting in all at least eleven days, but usually

longer. When full grown "the caterpillars are striking objects, cylindrical, plump, naked worms, growing to the length of nearly two inches, with transverse bands of yellow and black." (Scudder.)

"Then comes the change to the chrysalis, to seek a good place for which the caterpillar usually leaves the plant (though I have found the chrysalis hanging pendant from the leaf) and seeks some such stable place as the under side of a fence rail or a jutting rock from which to suspend. Here it hangs for a variable period—two to fourteen days, according to the season and temperature, and perhaps the exposure." "At last the golden spots (on the chrysalis) begin to lose their brilliancy, and the beautiful green disappears; the orange wings of the imprisoned butterfly now become visible through its temporary sarcophagus, which it bursts open on the following day, and the liberated insect soon takes wing to join its comrades, select its mate, and pass the happy hours of a brief existence in revelling in the sweets of the flowers among which it sprang into being." (Peale, quoted by Scudder.)

The milkweed butterfly is one of the commonest and most widely distributed of our butterflies. Collect two or three specimens from the meadows, noticing meanwhile their flight, places of lighting, size, and color. It measures four or five inches from tip to tip of its wings. It has two pairs of large orange-colored wings trimmed in black. But the margins are dotted with white. The veins on the wings and the body of the insect are black dotted with white spots. "Of easy quiet flight when undisturbed, often sailing smoothly with wide-spread wings, yet ever ready to do battle with a tempestuous wind, a reckless adventurer in its contrasted livery of orange and black, it seems the very beau-ideal of the contented, happy-go-lucky butterfly."

The organs of the butterfly worthy of special study are the wings, the eyes, the tongue, the scales, and the legs. A close examination of the delicately formed and beautiful wings gives us a striking view of nature's handiwork. An interesting question has arisen whether the butterfly can see clearly, and whether it does not direct its movements more

by smell and touch than by sight. The tongue, coiled up like a delicate watch spring, is formed by fastening together two long hair-like half-tubes. These, when uncoiled and properly joined, form a long, slender, tube-like tongue, with which the butterfly reaches down into the cups of clover, milkweed, and thistle blossom, and draws up honey for its food. The scent scales are of peculiar importance and the protective coloring of caterpillars, chrysalides, and butterflies, by which they manage to escape their enemies has been studied with much interest by entomologists.

At all the three stages, of egg, caterpillar, and chrysalis, the insect is in danger from open and secret enemies. The great majority of eggs are probably eaten before hatching out by spiders and large insects, and by small parasites. The caterpillars are in constant danger from spiders, crickets, and bugs, from birds and reptiles, and from the parasitic flies that lay their eggs in the grubs and destroy many.

The milkweed butterfly is found in summer as far north as Hudson Bay, and throughout all parts of the United States where the milkweed grows. It is supposed to be properly a tropical insect. In summer it is believed to migrate northward with the season, and in some cases south of parallel thirty-one, to come out again in the spring to lay eggs, while many probably migrate southward to warmer regions to continue their butterfly life. It is claimed that the insect may pass the winter in the egg state, as a caterpillar, a chrysalis, or as a full-grown butterfly.

During the same season what other butterflies do you see commonly along the roads and fields? Find in the garden some of the cabbage butterflies. Try to find the eggs and caterpillars. Watch their development and see if they go into the chrysalis state. Watch any of the common caterpillars and notice the plant on which they feed, the moulting, and the successive changes till maturity is reached. See if different butterflies get their food in the same way.

In comparing the different common caterpillars and butterflies observe the different plants and flowers on which they feed, the varying localities in which they are found, the differences in size, coloring, and mode of flight. Compare the

whole period of development in one butterfly with the similar period in another species. Can we mark distinct corresponding stages in all the butterflies observed? Do we find corresponding organs and modes of feeding in the different caterpillars and also in the butterflies?

What is the outcome of this comparison of the full life history of different species of butterflies? Briefly stated, it is that four distinct stages are clearly marked in the life of all the specimens observed and studied:

1. The egg. 2. The caterpillar with its moultings. 3. The chrysalis or quiescent condition. 4. The full-winged butterfly. The mode of life in each of the two active stages is very similar in different caterpillars and butterflies.

We have examined, however, only a few different species of butterflies. In your future excursions observe the caterpillars, chrysalides, and butterflies, with their life habits and changes, and see if your previous conclusions are correct. Notice also the life and metamorphosis of other insects, as moths and flies, and discover whether similar changes occur.

In Unity is Strength.

This is one of the most important truths taught in history. A deep conviction as to its value led to the confederation of the colonies during the Revolutionary War, to the adoption of the constitution soon after, and to the Civil War. As a political doctrine it has always been bitterly opposed by extremists in favor of states rights. But the future security of our government and the welfare of our people are so greatly dependent upon its universal acceptance and practical realization in our laws, that it should be as carefully taught in history as are the laws of gravitation in physics. The portion of

our history that, by contrast, most forcibly teaches this proverb is the period immediately following the peace of 1783. Barnes* devotes to it not quite one page, under the heading, "Weakness of the Government." He states that under the Articles of Confederation congress *could* recommend, but not enforce; that bitter jealousies existed among the several states; that there was a popular desire to let each state remain independent; that a heavy debt had been contracted, which congress was unable to pay; that people rebelled against payment of taxes; and that in these circumstances many of the best men of the land felt the need of a stronger national government. This is a typical text-book treatment of the matter. No direct reference is made to the above proverb, but the same general truth is inferred from a brief statement of several important facts.

Following is the more detailed and more induc tive treatment of this idea of unity:

Let us consider what prevented the union of the thirteen colonies from breaking to pieces at the close of the Revolutionary War.

What had caused their union in the first place? How long had it lasted? Was it effective? In what respects was it a failure?

Congress had failed to raise sufficient money, to levy sufficient troops, to act with decision, etc. What was the cause of these defects? Congress was not endowed with large powers. But why not? Because the individual states were unwilling to surrender important rights to any central authority. What reasons, then, can be given for dissolving the Union at the close of the war? The war was finished on account of which the Union was formed. Also, each state wished to secure to itself all power possible.

*Brief History of United States, p. 142.

Let us see what facts changed this feeling:

1. According to the conditions of the treaty the states were to protect loyalists, restore to them property confiscated, destroyed, etc. Who was to attend to this? Congress. But congress did not have sufficient power. What must have been the result? The conditions of the treaty would not be fulfilled. Would England, then, be bound to observe the treaty? What effect would this weakness of congress have upon the general opinion entertained in foreign countries in regard to our own country?

2. At the close of the war most of the European nations were anxious to enter into commercial agreements with the United States. But when they saw the weakness of congress, what assurance could they feel that such agreements would be fulfilled on our part? Effect?

3. The states together had contracted a war debt of about $150,000,000. They were already poor, and little inclined to levy taxes in order to pay it. Congress, too, had no power to force payment from them. What effect would that have upon our credit at home and abroad?

4. When the Massachusetts legislature, in spite of much opposition, attempted to levy taxes for the general government, a serious rebellion was kindled, known as Shay's Rebellion. Congress did not interfere. Can you imagine the reason? It was afraid to.

5. American citizens were seized and sold into slavery in the markets of Algiers and Tripoli with little hope of energetic attempts at rescue by our government.

6. Congress was even unable to defend itself against violence. In 1783 it was driven out of Philadelphia by eighty mutinous and drunken soldiers. Did such facts bring honor or dishonor to those persons who were unwilling to grant important powers to the central government? Why?

7. Since there was no national coinage, what kind of coins would be in use? If English, French, German, and Spanish coins of various and uncertain values were the only coins in circulation, what would be the effect upon trade? What would prevent clipping and counterfeiting? How would a cautious merchant protect himself from deception?

8. What authority would settle disputes that might arise among the thirteen states? If there was no authority to do this, what might easily result?

(*a*) There were such disputes in abundance. The larger states wished to become rich at the expense of their weaker neighbors. New York levied tariff duties on firewood from Connecticut, and upon butter, cheese, chickens, and vegetables from New Jersey. The New Jersey legislature in defense, levied a tax of $1,800 a year on the light-house off Sandy Hook, belonging to New York. The Connecticut merchants pledged themselves to suspend all commercial relations with New York for twelve months. Pennsylvania discriminated against Delaware. Thus fuel for war was being collected.

(*b*) Differing policies in regard to importation of European goods widened the breach between the states. When the other New England states had virtually closed their ports to British merchandise, Connecticut, catching at an advantage, threw hers wide open.

(*c*) There were territorial as well as commercial disputes. Connecticut and Pennsylvania had each claimed the Wyoming Valley. It had been adjudged to Pennsylvania by a special federal court, although largely settled by the hated Yankees. In 1784 great suffering was produced in the valley by floods and cold. Then the Pennsylvanians, instead of furnishing prompt assistance, sent militia into the region, who plundered and burned the property of the Yankees and drove them into the wilderness. War between Connecticut and Pennsylvania was narrowly averted, after some fighting had taken place.

The territory now known as Vermont was claimed by New York, Massachusetts, and New Hampshire. Troops were collected for the support of these claims, but war was temporarily prevented through Washington's intervention.

From these data we see that our country was unable to command the respect of foreign nations, and even of its own citizens; congress could not carry out its agreements, pay its debts, protect its citizens, or even itself; trade was greatly hindered because there was no central power with authority to control coinage. The jealousy among the states was lead-

ing to hostile legislation that threatened civil war; civil war was further kindled by commercial and territorial disputes.

The only remedy for the evil in each case was a strong central authority; only through such an authority could the individual states be forced to abide by the conditions of the treaty; it, only, could levy taxes, quell insurrection, pay the national debt, protect its citizens, and thus command general respect. Only by means of this authority could the jealousy among the states be kept within bounds, the commercial and territorial disputes be properly adjusted, and frequent civil war be avoided.

In consequence of these facts union became a necessity; wise men came more and more to feel the force of the proverb that United we stand, divided we fall; or, In unity is strength.

After long discussion by representatives from the states and many exciting scenes in their convention, the final outcome was the adoption of the Constitution establishing a strong central government.

QUESTIONS.

1. Why is the period immediately following the Revolution called the Critical Period of American History?

2. Is the union of our states permanently established? If so, when was it accomplished? If not, when will it probably be accomplished? Give proofs.

3. What great orations have been delivered bearing upon this question? What was the occasion of their delivery?

4. There are already three different governments upon this continent,—Mexico, the United States, and Canada. They are fairly prosperous and living in harmony. Would you risk being shot at and killed in order to prevent the establishment of a fourth government? Why? Have our citizens ever had to answer that question in a practical way?

5. On what other occasions has our Union been threatened? State the circumstances.

6 What European nations have suffered particularly from lack of a strong central government? What was the nature of their suffering, and how long did it last? (Germany and Italy.)

7 What modern inventions have greatly aided in making a close union of our states possible? How?

CHAPTER III.

How Are Individual and General Notions Distinguished from Each Other?

INSTRUCTION is always occupied with either individual or general notions. It has been seen that differences in method are due first of all to the order in which these are presented; some teachers would begin with the general notion or rule, and furnish the individual instances later, as the rule for the plural of nouns ending in *s*, *x*, *sh*, etc., while others would take the opposite course. Since these two kinds of notions are of vital importance, it is well to have a clear understanding of the meaning of each.

The notions that are furnished apparently through the senses alone are individual notions. For instance, the images of the many things about us gained through the sense of sight belong to this class. I have an individual notion of the penholder with which I am now writing, of the room in which I am sitting, and of the meadow that I see from my window. Touch, without the aid of sight, gives a similar kind of notion; blind men get definite mental pictures of the objects about them by the use of their hands. It is an individual notion that one re-

ceives when he perceives the color of a flower, the odor of an apple, or the chirp of a bird. Thus each sense may be the source of individual notions or percepts, without the aid of the others. Usually, however, they work together, giving a combined result, as when one determines through the senses of sight, smell, touch, and taste that a certain object is an apple. In this case the idea is certainly very complex, but since it must be referred to one definite object it is called an individual notion.

The term receives a wider interpretation still, for it is applied to individual events and relations, as well as to material things. For example, when we read in history that Guy Fawkes attempted to blow up the English parliament with gunpowder in 1605, we picture an individual fact or notion. Again, when we say in grammar that the word *parliament* in this sentence is the direct object of the verb *blow up*, and is, hence, in the objective case, we speak of the individual relation existing between a particular word and another expression; in other words, we have a fact in mind which is as individual or concrete in its nature, as is the color of a particular flower.

A general notion, as its name implies, does not refer to one particular object and to no other, but to many of them, as the word river to a whole class of objects in geography. It differs from individual notions just as common nouns differ from proper names. The latter apply, in each case, to only one certain object, as Illinois to one of the Central States, while the former refer to any one of a class, as *child*

to any one of millions of persons. Proper names compose a relatively small class of words; almost all other words stand for generalizations; for instance, the verb *run* signifies a certain class of actions; *sweet*, a quality common to a great number of objects, the preposition *underneath*, a kind of relationship that may frequently exist between a noun or pronoun and some other word. Each of these, instead of applying to a single case and to no other, covers a multitude of individual cases or classes.

The nature of general notions is best seen by directing attention to the way in which they arise. If one has seen but one chair, he has then only an individual notion of chair; he has an object in mind of a certain size, color, material, weight, shape, etc. On seeing a second one, differing only in material from the first, the material of which it is made begins to be recognized as a subordinate matter. Let a dozen different kinds be seen, and more of those properties that are variable or individual come to be recognized as such; as, for instance, the color, weight, shape, etc. But some characteristics remain ever the same, though they be few in number. Each chair would be found to have a back and to be intended for a seat. If one hundred of them were perceived, these common qualities would appear one hundred times, while others would appear only once or several times, but not all of the time. These common or general properties compose the general notion, so far as it has been found. There is one important limitation, however. It could easily happen that each of the hundred chairs seen has not

three or five legs, but just four. In that case, according to the statement just made, the general notion chair might signify an object with a back and four legs, that was intended for a seat. But although all chairs thus far made were made with four legs, we know that it is not a necessary or essential property of chairs; they can have a larger or smaller number. Hence the word chair should signify an object with a back and intended for a seat. The idea expressed by this definition is what is meant by the general notion chair; it is the sum of those characteristics that are both common and essential to chairs.

It is by no means easy to distinguish the essential qualities of an object from those that are common or usually present but accidental. Every individual thing has very many characteristics, most of which are entirely peculiar to itself. But it requires much study to determine whether some of the more common ones are essential or not. For example, is it a necessary property of chairs that they be movable, that they be intended for one person, and that they approximate a certain size? Webster's dictionary includes the first two of these three limitations in the first definition of chair; it states that a "chair is a movable single seat with a back." Evidently the third is not considered a necessary property. Owing to the great difficulty in distinguishing what qualities are absolutely essential to a given object, it is seldom that really correct general notions even about common things are reached. Few educated men can correctly define table, or knife, or

house on the spur of the moment, or even after reflection. Likewise their conceptions of trade-centers and of social laws presented through literature and history (as suggested in the preceding chapter), are often quite undefined.

Still, children have a general notion of these things. Wherein, then, are their generalizations different from those of educated people? The difference lies in the degree to which accidental qualities are distinguished from essential ones. For a clear understanding of general notions it is necessary to realize that there are two kinds, namely, the *crude* and the *pure.*

As soon as children begin to use the plural number, to say even *two* intelligently, they are beginning to generalize. Of course, the individual characteristics of things are entirely confused with those that are common and necessary, and this confused state of mind exists throughout childhood. It is the only state reached by uneducated people in regard to most things. Such crude concepts are technically named *psychical* notions.

As already stated, even carefully educated men do not entirely escape this confusion. But their concepts are so much more nearly correct that they are often given a separate name, *i. e.*, *logical* notions. A really logical notion is one that is absolutely correct, or one that is entirely free from accidental properties: it is, therefore, a pure notion, in distinction from the crude (or mixed) ones held by the uneducated. It is rather the ideal toward which people work than the goal which they actually attain. It is

one of the chief aims of instruction to develop psychical into logical notions; progress in education means a clearing up of crude or psychical notions. Gradually children should be led to set aside, as unimportant, many of the qualities of things that they have been accustomed to consider as essential, and to recognize as necessary some that they have heretofore overlooked, so that they may perceive the general notion or law involved. It is very important to realize that, though logical notions can never be fully reached, they are still the goal of instruction, which is always striving to attain them as nearly as possible.

Knowing now the nature of general notions, it is easy to recognize them in their various forms. Not only do almost all words signify generalizations, but the rules of grammar and arithmetic do the same. The definitions of mathematics, as of triangle, plane, etc., the laws of physics, as the laws of pulleys, and of gravitation; the principles of science, as the economical principle that man is by nature lazy, and moral maxims, as that we should do unto others as we would have them do unto us, are all general notions; they are all reached by the same process, by the separation of non-essential characteristics from those that are essential. Definitions, rules, laws, proverbs, principles, and maxims are general truths or notions; the individual instances illustrating them are individual truths or notions. The former are different from the latter in that they cannot be imaged or pictured concretely. Any particular chair presents a certain appearance: it has definite form,

weight, color, etc., and the mental picture of it contains these particular characteristics. Any historical event has a peculiar setting: it was performed at a certain time and place, by a certain person or persons, under particular conditions, in a definite manner, etc. When it is reproduced mentally it must be accompanied with its peculiar environment. Objects and events that have never been actually witnessed but only imagined, must also be pictured in detail in the same way. But general notions and laws can not be thus clearly imaged or seen concretely. They do not apply to just one object, event, or relation, but to any and all of a class; in fact, they have no external, objective existence, hence they can not be limited to any certain form, color, time, place, setting, etc. The word chair signifies the common essential characteristics of *chair* without reference to any particular example; the preposition, *underneath*, a relationship that may frequently exist between nouns or pronouns and other words without naming any specific case; the moral maxim, honesty is the best policy, calls to mind a general truth without mentioning any instances that illustrate it. Frequently, however, these instances are so close at hand that, when the general notion is presented, one or more of the individuals that fall under it come immediately to consciousness. When we think *horse*, it is impossible not to call some favorite horse into mind. This only shows the relationship properly existing between individual and general notions. The latter are not creations entirely separated from the former, but are intimately associated with them.

*"The general notion is not a new mental product existing apart from and outside of the concrete notions, but it is *thought out* each time, inasmuch as a person from among the numerous ideas of the same kind (or also from only one idea) lifts exclusively the essential characteristics into the center of consciousness, and endeavors to isolate them from the others, which recede or withdraw (an attempt that is always, of course, only partially successful). It is like a melody that can be easily distinguished in a piece of music of several parts on account of special emphasis or peculiar registering, while, however, it never ceases to form a constituent part of the separate accords. It happens to us regularly, when we attempt really to think a concept and not simply to repeat the words of the definition, that we involuntarily glide down among its individual notions; that we hasten through these quickly and emphasize what is common and essential, rejecting the non-essential. The general is not really *separated* from the particular, but only *distinguished* from it; for deep down in consciousness it is always united with what is concrete."

* Lange's Apperception, p. 84.

CHAPTER IV.

WHY ARE GENERAL NOTIONS, OR CONCEPTS, THE GOAL OF INSTRUCTION?

THE declaration that logical notions are the goal of all instruction is so far-reaching in its bearings that it deserves further consideration. Pestalozzi called the attention of teachers emphatically to this truth, but he failed signally to apply it to his own teaching. Since his time men have commonly accepted his assertion as true, but, like him, have expended little effort in applying it to school instruction. In consequence, one of the weightiest thoughts in education has been largely overlooked by educators. How effect reform in this direction? It is certain that teachers will not labor persistently to reach after and apply generalizations in the classroom until they have learned both to distinguish between individual and general notions, and to appreciate the great value of the latter. The preceding chapter treated of the first of these two points—attempting to explain the difference between the two kinds of notions; the present chapter takes up the second point and aims to show why instruction culminates in generalizations.

Throughout this discussion it should be borne in mind that the value of individual or concrete facts

as the basis of all knowledge is by no means questioned. Undoubtedly the senses furnish the elements of all thought; it is only through individual notions, or precepts, that the higher notions, or concepts, can ever be reached. Modern philosophers, scientists, and teachers have demonstrated this principle so completely that it needs no further proof. Object lessons, excursions, pictures in class, etc., have been advocated so that learners might, through them, secure vivid concrete notions. Much of the recent reform in education has been along this line. Nevertheless the percepts thus obtained do not constitute the whole of knowledge; they are only its foundation: or, using another figure, they are the raw material out of which important thoughts are produced. But if instruction simply presented these facts and then ceased, it would be like the architect stopping when his foundation walls were finished, or the manufacturer ceasing work as soon as the wool was collected out of which cloth might be made. Such work by itself is useless; it must be followed by something more. So in education, percepts are not, *in and by themselves*, of vital importance to human beings; their worth consists not in themselves but in what they lead to or suggest beyond themselves, namely, concepts.

The question is, then, Why are concepts the instructor's goal? Let us consider some examples. The life of George Washington is of intense interest to all Americans. Any incidents in his boyhood are highly treasured; the details of his conduct at Braddock's defeat, at Valley Forge, during his terms

of office as president, and in his family, are preserved for all future generations. But why any concern about such events? Washington is dead, his age is past, most of his actions are not directly related to us. Why preserve them so carefully? The same questions may be asked in regard to Guy Fawkes. What difference does it now make whether or not a certain man of that name did attempt to blow up the English parliament with gunpowder in the year A.D. 1605? That was a long time ago, and our interests have shifted to very different scenes. Knowledge of that fact and its circumstances may happily prevent the appearance of ignorance at some critical moment, or help one to pass an examination creditably; but of what real use is it beyond that point? The answers to these questions are suggested by an analogy; *i. e.*, the history of the attention given to falling apples. Probably apples have been dropping from trees ever since Adam and Eve tasted of the forbidden fruit; but such little events have elicited no special interest until they gave hints to a philosopher of the wonderful law of gravitation. Their value, therefore, consists not in themselves, but in what they suggest. The same is true of Franklin's experiment with the kite and electricity. It would be ridiculous to preserve all the details of that incident if there were no universal truth involved in it; but since it led to the discovery of another great natural law, it is justly famous. Likewise the daring deed of Guy Fawkes is in itself wholly without value; but if it is the means of revealing a general truth, it becomes important. In this

historical event are revealed the boldness and wickedness of a few human beings and the hostility that once threatened a strong government. Such facts indicate the possible wickedness of other human beings and the occasional hostility that governments must encounter. These generalizations act as warnings and they influence present action. As far as Washington's character is concerned, it would make little or no difference to us if he did struggle with almost superhuman power at Valley Forge, were not the qualities that he there exhibited recognized as being in universal demand. Seeing how he acted under adverse circumstances, we are reminded of the way in which all men should act. We forget that his was an individual character, and we idealize and universalize it. Then, by comparison of our own lives with this ideal, we recognize the demand made upon us for nobler living. Thus, the Washington of one century ago touches the men of to-day through the universal qualities of character that he presents. His life bears no immediate relation to our own, but it suggests rules of conduct which, being general or universal, are binding upon all individuals alike. The motives that controlled his actions could scarcely be even matters of curiosity now, did they not seem sufficiently admirable to possess this universal worth. This same thought is suggested negatively by the attitude of students toward trivial facts that are sometimes insisted upon by the teacher as worthy of study.

Who cares what the name of the man was who assassinated William of Orange? Even if one knew

it to be John Felton, what worth is there in the knowledge? Pestalozzi is said to have observed with care the cracks and the knot holes in the schoolroom wall with his pupils. Suppose I know that there are twenty-eight cracks in the plastering of any room, you would smile at my stating the fact, and perhaps remark, "What of it?" If so many cracks indicated that the plastering was about to fall, it would prove an item of interest. But as it hints at no such rule, nor at any other, it is valueless. Here a standard is offered for measuring the worth of facts. To the extent that they hint at something larger, to the extent that they suggest some general truth or law, they have value; but if they fail to do this, they are worthless. According to this standard, would it be wise or unwise to learn the most eastern cape of South America, the several margins of leaves, the dates of the first three French and Indian wars, etc.? If this standard were actually applied, many facts ordinarily taught would be ruled out of the curriculum.

The study of past events is valuable, therefore, to the extent that they suggest laws which are applicable at other times and in other places. Concrete facts in all subjects of study are at least comparatively worthless, unless they are recognized as instances of general truths. Examples in arithmetic are worked, not primarily for their own sake, but in order to reveal the law governing the process involved. Even when, through proper correlation of studies, the answers to problems are in themselves valuable facts and, hence, worth finding out, the

value of the process lies in the rule that is discovered; an interesting answer aids the arithmetic by furnishing a strong motive for observing the process closely; thereby the rule makes a deeper impression. Everywhere general notions are of especial value because they find a broader application than individual notions; they possess universality. This thought has been tersely stated by Kant in his assertion that, "*Anschauungen ohne Begriffe sind blind,*" or, Concrete notions without generalizations are blind; they reveal nothing, they apply to nothing. Hence we conclude that the first great use of generalizations is that they reveal unlimited application or universality in knowledge. It is probably incorrect to say that they are more important than individual notions, for both are indispensable One would scarcely say that the light in a lighthouse is more important than the lighthouse itself, for the latter is the condition of the former; yet the tower was constructed in order that it might contain the light, and it would be worthless without it; hence it finds its value in the light that it carries. The final object of the entire structure is to furnish light. So the final object, the goal of instruction, is the generalization, although individual notions are indispensable in attaining it.

Second, generalizations are a necessary condition both for thinking and for the expression of thought. Probably very little thinking takes place without the help of words, or symbols that are equivalent to words; they are the only track upon which thought glides along smoothly. That being the

case, it is evident that if all words signified individuals, as do proper nouns, thought would be very much limited; general statements would be impossible. Even the simplest assertion could not be made. For instance, in the sentence, *Chicago is large*, both *is* and *large* are words standing for concepts, and would be wanting. Or, if they were used at all, it would be as individual terms and, in that case, they would be unintelligible to all except those who knew them as proper names are known; nor, in that case, could they be used in reference to other individuals. Without general terms, *i. e.*, without common nouns and the other seven parts of speech, all general notions, rules, maxims, laws, and so forth, would fail us. Argument would be impossible, and logical conclusions could not be drawn. But when general terms are allowed, and when the concepts for which they stand are abundant, thought becomes free. Not only that, but when concepts are well developed, a great impetus is given to thought. For example, if the general truths are well established in one's mind that heat expands and cold contracts, or that everything that happens has an adequate cause, one is prompted to imagine possible applications of this law to practical affairs. Philosophers, scientists, etc., who have reached a large number of such generalizations are continually occupied in using them as the basis for new hypotheses. Thus great mental activity is secured and valuable conclusions are reached. The free expression of thought to others is also involved in the existence of concepts. If people were con-

tinually seeing different objects and having different experiences, while general terms were wanting, there would be no way for one person to communicate his ideas to another. Any word employed would signify only the particular experience of a certain individual. But with an abundance of concepts and terms for the same, thoughts can be readily communicated; then, even though people be not acquainted with the same individual objects, the common use of the same terms allows any word to signify essentially the same thing to each mind. For example, the words *is* and *large* are no longer limited to a certain individual, but enjoy their present wide application.

A third important consideration is that the possession of carefully developed generalizations signifies a good classification of one's knowledge. In order to be of practical use the books in a library must be carefully classified or arranged in groups, those of a kind being placed together. This is a matter of so much importance that in any large library several men devote all of their time to this work. Without such care books are forgotten or cannot be found, and hence they prove useless. The mind is practically a great library in which ideas need likewise to be carefully grouped. It is of little value for a man to collect a large number of precious experiences if they cannot be found when wanted. Chaos is as utterly opposed to utility in the case of ideas as in the case of household furniture, toilet articles, books, etc. As already seen, nature compels some degree of classification of our notions, for

the essential characteristics of an object are presented to us in each individual of a class, while the non-essentials are likely to appear only once, or a few times. Consequently the class notions are especially impressed upon the mind. But this help of nature, or this natural tendency to classify, is not sufficient. Special effort must be made to harmonize and rightly group our ideas, otherwise, they will be often contradictory to one another or poorly defined; and those which are quite unrelated will be found in the same group, just as books under widely varying titles may by accident be placed together. If the boundaries between groups of books were as indefinitely fixed as the boundaries between *character* and *knowledge*, or between the *power to think* and the *tendency to think*, (terms which are often used as synonymous), as much blundering might possibly result in trying to use the books as actually results in attempting to employ these terms. But proper classification involves more than the careful separation of experiences into groups; it involves the ranking of the same according to their relative worth. Some facts are of far more value than others, just as the officers of an army are far more important than an equal number of common soldiers. Unless one's generalizations have been carefully developed, he is likely to overlook this matter of relative worth and to neglect the higher and especially important notions. Teachers who have had no professional training show this tendency plainly. Their minds are so occupied with the details of teaching that they fail to distinguish more important from less important mat-

ters, and the idea of supreme importance, namely, the chief aim of instruction, is the one most neglected in their daily thought.

It is organization of knowledge that is involved in the present discussion. In this age of unbounded faith in the efficiency of organization in all fields, the organization of thoughts should not be neglected. It is the most economical means of caring for one's knowledge. Ideas that exist in a chaotic state are wasted; the more valuable the collection of them, the greater the waste. Until they are assorted according to their essential characteristics, and ranked according to their worth, it is impossible to retain them in memory, to survey them easily, and to find them at the moment of need. Since to generalize means to sort and rank notions, it is plain why instruction culminates in generalizations.

There is a fourth reason for regarding generalizations of supreme importance. They are the means of apperceiving new experiences of any kind. It is through them that it becomes possible to acquire knowledge quickly and easily. Just as a new book readily finds its proper place in a well classified library, so strange ideas readily find classification in a mind whose contents have been carefully arranged. This is seen in the reading of books on education. One who approaches a pedagogical work with an organized or systematized body of thought has a framework into which to place new ideas. He knows quickly where each idea belongs, so that even if the arrangement of points in the book is poor, it

need not be poor in the mind of the reader. Also, as in an army the relative rank of men can be quickly determined, so the relative worth of the many thoughts can be recognized. The system of thought (or the organized generalizations) already at hand is the framework and standard according to which all ideas can be located and measured. Thus, the profit from reading, from sightseeing, and from conversation is directly dependent upon the extent to which one's ideas are brought into order and ranked. It is only through classification that much confusion and loss of time can be avoided. Generalizations are, then, to the thinker what the compass is to the seaman; they enable him to keep his bearings in strange regions.

Four reasons have been assigned for laying great stress upon generalizations: (1) they secure unlimited application or universality, to knowledge; (2) they are necessary both to free thinking and to free expression of thought; (3) they signify proper classification of knowledge; (4) they are the means of apperceiving new experiences readily and correctly.

CHAPTER V.

DO GENERALIZATIONS PRECEDE OR FOLLOW INDIVIDUAL NOTIONS?

IT has been shown that general truths are the central objects of interest in instruction. The process of acquiring knowledge consists in securing an insight into them and the ability to apply them easily in all possible directions. For instance, one has added much to his knowledge when he has come to see clearly the single general truth that the presence of a definite aim is the condition of effective work in any line; the teacher may apply this generalization first of all to the school, seeking out the great purpose of instruction; then to each branch of study, and to each recitation; finally, he may apply it to other spheres of activity, as to that of the lawyer, of the minister, and even to human life itself; one may never finish the application of such a broad truth, but knowledge grows as insight into it and ability to apply it are increased.

The inquiry next in place touches the manner in which generalizations should be reached. Should they precede or follow the study of individual notions? The first distinction between good and bad method, or the first test of method is found in the answer to this question.

There has been only one possible way by which the race has arrived at its store of general truths, *i. e.*, through concrete or individual experiences. By experiment in its childhood it learned that flint makes good arrow heads, that meat spoils quickly in warm weather, that the deer has certain habits. Higher truths have been reached by more developed peoples, but by the same route. Very slowly have the laws been attained that pertain to falling bodies, to the properties of gases, the pressure of air, etc. The data for the same have been recorded one after another, and often centuries have elapsed between the time when the data for a great law were recorded and the time when the latter was really brought to light. In other words, the progress of the race has been necessarily inductive; it has reached the abstract or general through the concrete or individual.

In many respects the child is an imitator of the race. It is asserted by numerous eminent authorities that the chief stages in his development correspond in a large way with those of the race. If he passes through the same great culture epochs as his ancestors, it is quite possible, then, that his approach to general truths would be the same as theirs. Herbert Spencer is of the opinion that this is the case. He says, "As the mind of humanity, placed in the midst of phenomena and striving to comprehend them, has, after endless comparisons, speculations, experiments, and theories, reached its present knowledge of each subject by a specific route, it may rationally be inferred that the rela-

tionship between mind and phenomena is such as to prevent this knowledge from being reached by any other route, and that, as each child's mind stands in the same relationship to phenomena, they can be accessible to it only through the same route."*

Aside from this argument, the proper answer to the question whether the statement of generalizations should precede or follow the study of individual notions, seems almost self-evident from the discussion in the previous chapter.

Since concepts or general truths can be drawn only from percepts or individual instances, it seems necessary that these latter should be presented and discussed before the former are deduced and worded. Just as the acorn must be present before the oak can be produced, so the concrete example must precede the abstract rule; in both cases growth is involved; in the one instance it is a material growth, in the other a psychological one. One might as well expect noise without vibrations as generalizations without particulars. And the order in which individual and general notions are produced should fully determine the order in which they should be studied by children. To think them out clearly means indeed to produce them. It is a common practice to offer the generalization first and then to furnish illustrations later, as though the individuals could properly follow rather than precede the general. But the practice can not be defended. The general truths are not a finished product that can be handed about from person to person, examined

*Education, Chapter 2.

and traced back to their origin. Each man, in order to have them really, must give birth to them within his own mind, and they must be born out of the individual notions that are already there present. "The general notion is not a new mental product existing apart from and outside of the concrete notions, but it is *thought out* each time, inasmuch as a person from among the numerous ideas of the same kind * * * lifts exclusively the essential characteristics into the center of consciousness and endeavors to isolate them from the others which recede or withdraw."

It seems clear, therefore, that general truths should be taught after individuals; that, in fact, this is the only proper sequence. Yet the world has for ages allowed the other, and probably, to-day, the great majority of teachers present first the rule, then the example. Almost all text-books were modeled after this plan until very recent years; gradually, now, books following the inductive method are being introduced into the schools. One explanation of this error is that it seems to the instructor much easier to teach in this way. It requires great energy to collect a large number of facts, and then to so arrange and compare them as to lead to an important law or truth. And especially does it require great energy to keep this course up. No wonder, then, that it has not been usually done. If we want children to comprehend and learn important principles, why not give them these latter outright? Or, still better, why not give them these together with a few examples—then the result is assured. So

teachers reason, and so they act, thus obeying the universal desire to avoid work. Another reason for this short-sightedness is found in the desire to save time. It is a very slow process to approach broad truths inductively. It seems a much shorter, simpler route to learning to offer rules outright and have them committed to memory with a few illustrations. However, it means a loss rather than a saving of time. For instance, when children begin *mode* in grammar by learning that it is "the manner in which the action, being, or state expressed by the verb is stated or conceived," time is likely to be lost, because these are mere empty words until the pupils have been made conscious, through numerous examples, that there are several ways of conceiving action, being, and state. Usually, although children have been comprehending and speaking their mother tongue for many years before this definition is reached in school, they have reflected so little upon their own speech that they are ignorant of the existence of several modes. It would require considerable time to reach back into their experiences and collect enough instances in which action, being, and state have been differently conceived, to convince them that this definition pertained to their own lives or had any worth for them. Consequently, when they learn it first, they get empty words and not a thought. The same thing is true in geography when definitions of mountains, plateau, etc., are given before particular mountains, plateaus, etc., have been studied. The emphasis now laid upon home geography is partly caused by belief in inductive work.

One cannot always visit a mountain, plateau, etc., but he can study one or several of these objects in detail before receiving a definition of the same. No time is saved by presenting the rule for division of fractions or the definition of specific gravity, before numerous concrete examples have been carefully examined. In all cases, whatever time is spent in pretending to understand what one does not and, from the nature of the case, cannot understand, is entirely lost.

But there is more than a loss of time involved in giving the generalization first, for children are thereby forced to approach a subject from the least attractive and most difficult side. They are called upon to master the words for a thought that is not expected to be understood till later. Just as it is injudicious for men and women to present their least agreeable side to strangers, so it is unpedagogical to introduce children to topics in a way that least appeals to their past experiences and interests. When the rule is placed in front they are necessarily reminded of their weakness rather than of their strength, and an unfriendly feeling is engendered toward the subject in hand. Consequently time is lost and children are repelled by such instruction.

But many eminent men have been educated in just this way, and it often happens that general truths are immediately comprehended by a class on presentation. Is it entirely in vain, therefore, that rules are offered directly with the hope of abridging the process of acquiring knowledge?

If it is true, as was asserted, that generalizations arise in only a single way, that they have their origin solely in individual notions, then there is only one possible way of approaching them. The fact that they are at times fully understood as soon as heard, is no exception to this rule. In such cases past life has happened to furnish enough individual experiences, and these are sufficiently present in consciousness to give a meaning to the words that are heard. The reason that the words are comprehended is that the truth has already been reached inductively and it is now simply being worded. Now and then, too, where past experience bears apparently little relation to some general statement, a person shows strange power to reproduce and mass data that can explain it. But that is the privilege of a genius. Even in such cases, unless the supposed generalizations are merely reviews or applications of truths developed in the past, they are still in reality approached inductively, although the contrary seems to be true: the words are empty, or carry only a doubtful meaning, until concrete facts are called to mind which form a basis for drawing the desired conclusion; light is then shed upon them, or they are given a content. The statement of the general truth first is, therefore, merely a challenge to hunt up the data that prove the truth. With trained adults acquainted with the subject, and with very bright minds, the challenge is received joyfully, and activity follows that results in clear insight.

But that does not happen in ordinary instruction. Usually the generalizations that the school

should teach are too far in advance of the child's or youth's knowledge to be understood at a glance; or, even if his past experience actually contains all of the concrete facts required, they are so scattered and so far removed from consciousness when needed, that they are practically wanting. Then this pleasant challenge is converted into a disagreeable command; it is a circumlocution in method that causes loss of time and destruction of interest.

The conclusion is therefore reached, that the only wise course is to present concrete notions in advance of the rules which they would teach. Accordingly, the statement of the rule for addition of fractions should follow the solution of several examples involving addition; the law for the metamorphosis of insects should follow the study in detail of one or more types of insects; likewise the definition of trade-center, the underlying truth in the Golden Touch, and the proverb in regard to unity should all come after the concrete data. The second presentation of each of these general truths, as outlined in chapter two, illustrates how this might be planned.

With this important fact established it is possible to distinguish the outline of general method. There are three great topics to be kept in mind; namely, individual notions, general notions, and the application of general notions. There are no others, because these three cover the entire field; there is no part of instruction that can fall outside of them.

From what has immediately preceded, these three topics must be treated in the order mentioned; *i. e.*,

first, individual notions must be taught; then progress should be made from the individuals to the generals; then these latter should be applied. This necessary order constitutes the first great law of method.

And since all mistakes in method of teaching can be made only in one of these three fields, there are naturally three leading questions in method:

1. How should individual notions be acquired?
2. How should the progress be made from individual to general notions?
3. How should general notions be applied?

If there is a necessary order in acquiring individual notions, and also of passing from individuals to generals, then, besides the great law of method already mentioned, others may be established which will prove of great value. It is the province of the following chapter to discuss the first of these three questions.

CHAPTER VI.

How Should Individual Notions Be Acquired?

WE HAVE already discussed the nature of individual notions in distinguishing them from general notions, and have seen that they are identical with *percepts* and *concrete notions.* A large number of such notions are acquired during the first years of life by direct contact with individual things. Children see, handle, taste, smell, etc., and thus receive their first impressions. They also perceive individual events and relationships. The birds in their neighborhood build their nests and rear their young; their favorite trees blossom and bear fruit; the seeds of certain flowers are found to be transported in all directions by the wind and often by animals; the cold weather causes the village pond to freeze over and certain vessels containing water, to burst. The intercourse of men with one another is likewise noted; one speaks angrily with another; two are observed to be united by the bond of friendship; some perform many kind acts while others seem to be guided by certain ignoble motives, etc. All such things and many more are perceived, and leave impressions called individual notions. This process of learning continues throughout life. But if a person is left entirely to himself in acquir-

ing such knowledge, he is likely to omit the observation of some matters very essential to right living, and to be very superficial and even positively incorrect in many of the facts noted. One sees birds daily, but it is rarely the case that he can describe common birds accurately; favorite shade trees that line our streets, as the elm and the maple, are scarcely seen, although we almost touch them every day; few can tell when they bear flowers and seeds, or whether they bear them at all, or not. Many persons can not even tell the color of the eyes of their friends and daily companions. Carelessness in the observation of common events is just as striking; we fail to note the direction of the wind, the habits of animals, the arrangement of the stars; few can tell how a cow lies down or how a horse gets up. This inability to see correctly, or to see at all, is shown in a practical way in the courtroom by the failure of eye-witnesses of objects and events to agree as to what was seen.

It is clear that school instruction should begin early in life in order to extend sufficiently one's range of observation and make him accurate. Since individual notions are the sole basis for generalizations, it is important that the former be abundant and clear and accurate; hence they must be carefully treated in the school.

Instruction must depend largely upon words to build up these new mental images. The objects and events to be discussed cannot usually be present to the senses, consequently they must be presented to the mind through words or symbols. It is possible at this point to commit a grave error in teaching,

and instruction in the past has not usually taken precautions to avoid it. Teachers have been inclined to compare the mind with a jug, and to pour knowledge into the former as they would pour water into the latter; or to regard the mind as a storehouse where facts can be stored away as corn in a granary; or they have at least likened it to the stomach, taking for granted that facts, like physical food, would be seized and digested, provided they were brought within reach of the proper organ. With this conception of the mind, they counted upon imparting knowledge to it rapidly through the medium of speech. Words were supposed to possess such peculiar power that descriptions of objects, events, etc., or statements of facts, could build up within children vivid and correct mental pictures. That view of teaching made instruction an easy task; any one could teach who could govern and who had the knowledge, for his duty consisted simply in telling pupils that which they were desired to know.

But the modern understanding declares teaching by no means so easy or mechanical; there are several important conditions to be fulfilled before the telling of facts can result in real knowledge, and it is the observance of these that makes teaching a difficult process. One of these conditions that is essential is suggested by a story that Rousseau relates in his Emile.

He had accepted an invitation to spend a few days at the country home of a woman of rank who was much interested in the education of her children, and he happened one morning to be present in a

history recitation conducted by a private tutor with the eldest boy. The topic under discussion was the well-known story of Alexander and his physician, Philip. It was related how the former, though warned by friends that Philip was untrue to him and was awaiting an opportunity to give him poison, nevertheless, when in need of medicine, took the proffered goblet and drank its contents without delay. At dinner the child was called upon to relate the narrative and did so amidst much applause. There then followed some discussion of its merits. The majority of the guests present agreed that Alexander was very rash, while some, among whom were the tutor and the boy, greatly admired his bravery. This was enough to convince Rousseau that none of them had any appreciation of the real greatness of Alexander's act. It was to him first of all a profession of faith in mankind. Alexander believed in human virtue; he had faith in his friends, even to the extent of putting his life in their hands. But the great educator was particularly interested in the interpretation which the boy might put upon the story; accordingly, at the first opportunity after dinner the two took a stroll together through the park. Rousseau had already come to suspect, from several signs, that the boy had not the faintest comprehension of the story which he had related so beautifully. He, therefore, questioned him at his ease and found that he, more even than his instructor or any of the guests, was an admirer of the courage that Alexander had displayed. "But," proceeds Rousseau, "do you know wherein he saw this cour-

age? Solely in the act of swallowing a bitter-tasting potion without hesitation and without showing the least repugnance. The poor child who, less than two weeks before had had to take some medicine and had found it extremely difficult, had still the after-taste of medicine in his mouth. To him death and poisoning meant only disagreeable sensations, and he could conceive of no poison more disagreeable than his own drug. However, I must confess that the courage of this hero had made a deep impression upon his young mind, and he had firmly resolved to be brave like Alexander the next time it might be necessary for him to swallow such a draught."

Here we have a simple narrative interpreted in four different ways, and it is easy to determine the cause. The taking of medicine being an important incident in the anecdote, and the boy's experiences along this line being recent and vivid, he made out its meaning through their help. The tutor, also, saw bravery in Alexander's act, but of a different kind; no doubt having read about or witnessed many courageous deeds, they were present in his mind at this time and determined in what light this event should be viewed. The majority of the guests considered Alexander very rash, because they called to mind, in interpreting the deed, past experiences that were only superficially related to it, while Rousseau, being a man who had learned to appreciate the beautiful and noble, had apperceiving feelings which led him to class this among the noblest acts of man. Thus it is the past that conditions the present; it is our past ideas, feelings, habits, etc.,

that interpret the new experiences which are offered us. This fact is seen in the varying impressions that the members of an audience carry away from a lecture which all have had an equal opportunity to hear. It is seldom that a simple announcement to the several hundred students in a normal school is understood in the same way by all present. In such cases the difference in interpretation can not be due to a difference in what is heard, for all hear exactly the same words; it must be due, therefore, to a difference in those that listen; according to the thoughts that are uppermost in their minds they get meaning from the words that are uttered. This is equally true in the interpretation of classic paintings. Probably a great majority of visitors in the picture galleries at the World's Fair felt little emotion while viewing the finest paintings there; they were frequently interested in the subject presented, in the peculiar coloring, and in the vividness with which objects "stood out," but the finer points, as the position of the body and of the arm, the expression of the eye, of the lips, etc., in pictures where human action and suffering were portrayed, were probably largely overlooked because, owing to the absence of classic pictures in this country, most people never learn to read and enjoy them as they do good books. It is clear, then, that we "proceed from the known to the unknown" in learning, or that we "get out of a thing what we put into it."

There are two considerations which must be continually kept in mind if the great law of learning shall be successfully applied by the teacher.

First, any new knowledge offered to a child must be met by old ideas closely related to it, if it is to be well comprehended and appreciated. A child who has been blind from birth and whose sole means of discovering the presence and quality of objects is through the sense of touch, cannot comprehend how an ordinary person can know that there is a horse down the street; it is necessary for the blind child to go and place his hands upon the animal to determine where and what it is. Also, having no appreciation of color, he is unable to distinguish what things have that characteristic, or to see anything inappropriate in the question, What is the color of the days of the week? One child to whom this query was put, very naturally replied that they were probably blue, for he had heard people speak of "blue Monday;" another likened red to the sound of a trumpet. Thus the absence of a certain class of experiences prevents the possibility of interpreting ideas belonging to that class.

The majority of men would learn almost as little from a lecture on Calculus as the blind boy from one on color. But as things begin to come within our range of knowledge and interests, they begin to carry meaning. The wild Indian on the western plains would appreciate the sight of a man climbing a telegraph pole in modern fashion, for he does enough climbing himself to realize that it is no easy task to go up a smooth pole. Still, there is such a wide chasm between his daily thoughts and most modern inventions, that he would be unlikely to regard a steam engine as anything else than an awful

monster. The school boy who reads about the threefold division of society in European countries is confronted by much the same difficulty; his environment being usually his sole source of help, he attempts to divide his own little community into three ranks according to the description. In this country the attempt necessarily meets with failure, and consequently the thought has little force. On the other hand, Hawthorne and Cooper appeal to children amazingly because their stories deal with events and interests which are closely akin to daily experiences of boys and girls. Thus in applying the law that new knowledge can be acquired solely through the old, it must be remembered that the relationship between the new and the old must be very close, if the former is to be well comprehended and appreciated.

The second consideration is just as important as the first in influencing the method of teaching: it is that we must be fully conscious of this close connection between the known and that which is yet to be learned. If this consciousness is lacking, the two are practically disconnected, no matter how close their real kinship may be. We often meet old friends and regard them as strangers, and this happens so regularly in the school room that it would be difficult to accomplish it more certainly, even though it were planned for.

For instance, children are not expected to distinguish the grammatical subject and predicate of sentences before the eleventh year of age. But they have been speaking English nine or ten years and understanding it fully as long. Of course, then,

they know "what they are speaking about" when they utter their thoughts, and they know well, too, what they say about their topics of conversation. They understand their mothers and their friends just as well as themselves. Any child, then, has had daily practice for ten years in distinguishing "subject" and "predicate" and has become quite an adept at it before he is required to study such matter in school. What teachers need to do is to remind him of this abundant experience and show him that, while he knows a great deal about this topic, there are many things yet to learn; he is then ready for work. But, alas! What is usually done? Without reference to the past, words are repeated and drilled upon until children are fully convinced that subjects and predicates are farthest from their daily needs, and in despair they declare prepositions, adjectives, conjunctions, etc., to be subject or predicate, according as they think they can best please their instructors. Mode is surrounded with the same strange atmosphere. In spite of the fact that children are actually using all of the modes continually; in spite of the fact that they have already been introduced to two of them in the primary, namely, the indicative and imperative, under the guise of *telling* and *commanding* sentences; and in spite of the fact that they are already acquainted with both words, *mode* and *mood* (as in fashion journals, "mode" of doing this and that, "pleasant mood," etc.), the topic is so taught that both the words and ideas seem never to have been heard before or to have no bearing upon daily living.

Many a teacher of Homer or Virgil confuses his pupils for weeks by talk about scansion, quantity, feet, and accent. High school students may become fully lost in such work, notwithstanding the fact, that even as babes, they greatly enjoyed the rhythm of Mother Goose, and the regularity of accent found later in poetry for children. If high school professors would only establish the conviction in the minds of their students that this subject of scansion is a very familiar one, and even that a principal difficulty in reading in the primary grades is the tendency to scan or sing the poetry read, this whole subject would be greatly simplified.

Latitude and longitude is another topic that teachers apparently plan to make mysterious. It must be so rendered so long as it is isolated from the child's daily sphere of thought. What are their past experiences, bearing closely on this subject? It is a fact that most small towns, as well as large cities, are divided by a principal street running north and south, and by another running east and west The location of any house is determined with reference to these two dividing streets. Distance from each of the two is usually measured by blocks, and the streets are sometimes named after distinguished men, at other times they are merely numbered. The child who studies latitude and longitude often knows all these facts well, and they should form the introduction into this new field. The earth is given dividing lines as is a city, and for the same reason. The equator corresponds to the street running east and west, and the principal meridian to that run-

ning north and south. Places on the earth's surface are located with reference to these two lines, and distance is measured by the number of degrees instead of by the number of blocks. If approached in this manner, latitude and longitude would seem a reasonable and natural subject of study. From the beginning the pupil would feel at home with it, and at the same time feel a need for it. And hence, in studying it he would be much more likely to keep his bearings well and be profited.

It is strange how topics that have been thoroughly and even easily mastered in one study may appear difficult when broached in a very different study. The matter of exponents is an example in point. In arithmetic, without any special effort, children comprehend that the square of two, multiplied by the cube of two, equals the fifth power of two, and that the cube of three multiplied by the cube of three equals the sixth power of three. It could not be otherwise. Examples are frequently given by the teacher bearing upon this point, and seldom or never do pupils trip upon it. But how different in algebra! Exponents are there the bane of the student. In spite of the fact that high school classes are drilled continually upon the rules pertaining to this subject and are given abundant practice in application, from my own experience in examining twenty-five high schools in Illinois, three out of five students will declare that the square of A, multiplied by the cube of A, equals the sixth power of A. What a quantity of effort might be saved if, in approaching this topic the first time, the related

facts in arithmetic were called to mind and made the basis for the study of exponents.

The fact should be emphasized that, though children are familiar with a certain object and have seen it often, yet if they believe the contrary, the contrary might as well be true, so far as the acquisition of knowledge is concerned. For instance, I once knew of a room of forty fourth and fifth-grade children in which nearly all asserted that they had never seen a valley. Of course, under those circumstances, they could not be expected to feel at home in the study of valleys. Yet it was soon discovered that every child had traveled upon the railroad; that he remembered having crossed several bridges; that water was seen underneath. There was even a small stream in that town which the children had often crossed on a rather high bridge. Of course, then, they had seen valleys; and those which they had seen should certainly have formed the introduction to the discussion of this subject.

The principle here involved applies as much to the appreciation of feelings as to the appreciation of mere facts. Take, for example, the first three stanzas of Gray's Elegy in a Country Churchyard:

The curfew tolls the knell of parting day;
The lowing herd wind slowly o'er the lea;
The plowman homeward plods his weary way,
And leaves the world to darkness and to me.

Now fades the glimmering landscape on the sight,
And all the air a solemn stillness holds,
Save where the beetle wheels his droning flight
And drowsy tinklings lull the distant folds;

Save that from yonder ivy-mantled tower,
The moping owl does to the moon complain
Of such as, wandering near her secret bower,
Molest her ancient, solitary reign.

The thought here is so simple that it can be easily comprehended and still leave little trace of itself in the minds or hearts of pupils. This poetry is first of all an appeal to the emotions, and certain past *feelings* must be present in consciousness before it can be properly appreciated. As one recalls his pensive attitude on some well-remembered summer evening when, in the gloaming, he observed the cattle and the workmen winding their ways homeward, when darkness gradually shut away the outer world and produced a feeling of loneliness, when the noisy world grew quiet and only the buzzing of insects and the tinkling of bells could be occasionally heard, then, as these pictures and the accompanying feelings are vividly reproduced, is one in the right frame of mind for such a poem. Boys and girls must recall definite times in their lives when they enjoyed such reflections as these, and their feelings on those occasions must be reproduced, before they will be able to enter into the spirit of these stanzas.

This poem is a type of many subjects of instruction. In Sunday-school work, in prose literature, in history, in nature-study, and in art, real appreciation often involves much more than the mere comprehension of the facts or statements; new feelings are to be aroused, and in that case the past related emotions should be recalled and renewed before a

proper means for arousing more emotions can be considered to be at hand. We state the same general thought in other words when we say that feelings or moods are a great factor in education. The business man appreciates them. Like the teacher, he is attempting to influence customers by the ideas he presents, and, if he is skillful, he is very careful to broach a matter "at the proper time," *i. e.*, when his listener is in the mood for it. If the right mood is not present he postpones his business discussion until a more fitting time, or seeks to bring it about by introducing other topics of conversation for a period.

The child recognizes the same important principles of action in handling his parents. Even the infant is often too wise to ask a favor abruptly of his mother if he suspects it is likely to be refused; he cajoles her rather, until he thinks she is in the humor to grant his request, then he presents it. Children in school often exhibit the same tact in managing their teachers; they study the latter closely and vary their words and conduct according to the mood that prevails at the time. If instinct teaches business men and children to regard moods as highly important in all attempts to influence other people, why should not teachers obey the same impulse and be at least as pedagogical as these uninitiated ones? If they did so, they would feel their way cautiously into many a subject where now they rush upon it abruptly.

From the preceding facts it follows that new feelings are dependent upon old feelings for inter-

pretation and appreciation, just as new facts upon old ones; the law of going from the known to the unknown is evidently capable of wide application. There are two factors to be kept in mind in its application; not only must there be old knowledge and emotions closely related to the new, but the learner must be conscious of this close relationship. These two great facts suggest several important conclusions:

1. Good teaching deals primarily with ideas rather than with words, and it consists in fitting or dove-tailing new thoughts and emotions with those already in the pupil's possession; it is a process of adjusting the new to the old; and the extent to which a close adjustment is secured determines the effectiveness of the instruction imparted. Real skill is required to do this; hence teaching is not a merely mechanical work that any one can do. Not every one can teach; even those who know the subject-matter of instruction thoroughly may make an utter failure of it. In order to fit new knowledge to what the child already knows, it is necessary not only to be acquainted with the facts to be offered, but also with the child to whom they are to be offered; the latter is a more difficult task, yet the pupil must be thoroughly understood before deftness can be shown in the matching process. But while teaching is difficult, there is comfort in the fact that it is a kind of work in which skill can be acquired. It is not true that "teachers are born, not made." The average person can become, or be made, a teacher, provided he will study the child and the laws of influencing

him with the same care that he studies the subjects to be offered.

2. Words have no magic power; they are a subordinate instrument in the acquisition of knowledge, being mere symbols by which experiences are called to mind. If these latter are wanting, there is no effect. The eloquence of Cicero could not explain to a deaf man what music is, or to a blind man what scarlet is, if the defect in hearing or sight dated from birth.

Even the fact that pupils remember the words of the teacher, or of the book, and can repeat them promptly, gives no sufficient proof of knowledge; it gives proof only of a good memory. Very often the ability to reproduce exact words of definitions, etc., is only a cloak behind which ignorance is covered. For instance, exceedingly few English speaking people ever reach any real appreciation of *case* in grammar, although they can give the definition and some examples very readily. Few teachers of *case* ever have any warm feeling for that subject, which is evidence that they have not yet made it their own. Much *verbatim* memorizing is merely practice in unconscious deception, for thereby both teachers and students are persuaded that knowledge is acquired, when, in fact, it is only the symbols for ideas rather than the ideas themselves that are mastered.

3. The mind is not a passive recipient of knowledge, like a vessel for water, or a storehouse for grain. It is active in choosing; it applies the severe test of kinship to all that is presented to it,

ignoring whatever seems foreign and giving a warm reception to whatever appears closely related to its needs.

The past is, therefore, the foundation for all future learning. This is true of any kind of knowledge, and applies fully to the acquisition of individual notions. There is no short cut to learning by merely "handing over" ideas from one person to another; whatever is received is accepted solely on the condition that it find a foundation suited to it; all else is discarded.

It is the first duty of the teacher, then, to direct attention to the past related experiences. The architect provides first for the foundation of his building, and the stronger the superstructure is to be, the deeper he digs into the earth for the base. This takes time and costs much money, but it is manifest folly to omit it. The same is true of the instructor; the sole condition under which a sure reception can be found for what he offers, is that he direct attention very carefully to the old ideas as the groundwork.

This being true, it is evident that there are two distinct and important steps to be taken in the mastery of individual notions; first, the teacher should be employed with the related past experiences, preparing them for the reception of the new; second, the new facts should be presented. The first may well be called the step of preparation (of the pupil's mind); the second, the step of presentation. The two will be treated separately and somewhat at length.

Step One.

In ordinary practice this part of method is omitted. For instance, in beginning such a subject as England, in a geography lesson, no time is occupied solely with recalling, collecting, and arranging old ideas as a foundation upon which the new must rest; it is rather the custom to plunge into the new immediately. Even in literature, where the new selection is often introduced with remarks about the author, about characters in the play, etc., this step is largely overlooked. These remarks themselves are advance work, as a rule, while the step now under consideration deals solely with ideas which are already in the possession of the child. It requires much patience and foresight always to make room for this step. There is a temptation to move on, for progress is more apparent when the class is advancing in new knowledge. However, one should be patient enough to proceed more slowly and reap more solid benefits. One of the gravest faults in teaching to-day is the tendency to move too rapidly, and the first correction of this error should consist in the habit of taking time to recall the past experiences related to the topic in hand, before the latter is presented.

There is an objection to this statement which may easily mislead teachers. It is that if children are fairly well prepared for the studies which they are pursuing, many related ideas will spring up of their own accord, whenever any topic is presented. Why, then, occupy time in recalling thoughts

of the past, when they are likely to come of their own accord? There is enough truth in this objection to make it plausible. Undoubtedly in most cases some experiences will be recalled; but there is no guaranty that all will be reproduced, or even those most closely related and most needed. This matter is worthy of careful consideration, for when the preparatory step is omitted a serious danger is encountered in three ways.

First, there is the danger of *no* understanding of the subject presented. For instance, many a child has committed to memory the poem Excelsior, wondering the while what in the world it meant. The subject of scansion, already referred to, is another example of the same kind. Percentage is still another. Children are often mystified by the fact that, while there are so many fractions, those of a certain denomination called hundredths are singled out and greatly emphasized. The text-book, too, increases their perplexity by introducing the subject in a new chapter, as though it were quite different from what had preceded. As a result, they feel strangers to percentage and sometimes fail to find their bearings for a long period.

Contrary to the expectation of the teacher, a chasm may easily exist between the old and the new that is practically too broad to be bridged over by the pupil's own unaided effort; in fact, there is likely to be such a chasm, unless the instructor take precautions to prevent it: these precautions consist first of all in recalling a sufficient number of past experiences to allow an understanding of the new.

The second danger threatened by the omission of this preparatory step is that, even if children understand the ideas presented, they may feel a comparative indifference toward them. This is perhaps a more serious danger than the preceding. Gray's Elegy, already referred to, furnishes an example. That poem is frequently finished before it is really begun. That is, every stanza is understood by the child and it is laid aside as completed work, without his ever having begun to enter into its spirit. Likewise, civil government, English grammar, and beginning Latin are often taught and finished without any good effect further than the possession of a certain quantity of knowledge. This is not true teaching. To the true teacher the child's sympathy with the subject-matter taught is an absolutely necessary condition for success. The pupil should always be able to give a satisfactory answer to the question, "What is this subject to me?" A genuine glow of feeling must accompany facts that are to prove of permanent worth. A universal law is here involved. After one comes to understand a subject fairly well, he may fail entirely to appreciate it; but unless knowledge is really appreciated it is not permanently valuable. In time past the great majority of teachers have acted as though the possession of knowledge and its appreciation were practically identical. The Sunday school teacher, for instance, has taken for granted that, if she could impart a few Bible facts to her class, the children would be made more religious. Likewise, Shakespeare's dramas have been often taught with the presupposition on

the part of the instructor that, if each word and each sentence were clearly comprehended, a love for Shakespeare and for literature would be engendered.

There are few errors more serious. While one is learning to comprehend the Bible, or literary productions, or history, etc., an unfriendly feeling may be growing up which may result in hatred of the subject. And this is the feeling that is being aroused towards many subjects that are fairly well comprehended. That attitude of mind precludes the possibility of good. Both Froebel and Herbart, the two great educators of this century, urge the necessity of interest in the studies taught, and the importance of the development of tastes. If they are right, love must be substituted for indifference or hatred. It can be developed through the establishment of a feeling of kinship each time for what is offered. And since this feeling of kinship is dependent, as has already been shown, upon the consciousness of the close relationship between the old ideas and those newly offered, it can be aroused by careful attention to past related knowledge. A few examples will make this matter clear.

Let it be the aim of a recitation to study the most beautiful part of the Rhine river, and to discover in what respects it is beautiful. If, without any preparatory step, we begin a description of the Rhine itself, serious difficulties may easily arise. The conversation soon turns to valleys and beautiful views; it is this valley that is so beautiful. But children often do not remember having seen a valley,

or, if they do, they recall nothing about it especially attractive. This may be true of teachers as well as of children. I was once instructor in a county institute where eighty teachers were present. Seventy of them declared that they could not recall ever having enjoyed a beautiful view. But the fact was that in the town where the institute was held there were several beautiful views, one of the principal avenues being entirely arched over with elms. Of course in both cases they had all seen the object talked about, but not being conscious of the fact, they had nothing to build upon. They felt no kinship for the subject in hand, and hence a discussion of it could not appeal to them. As far as the Rhine river is concerned, most of those who are prepared for its study, both children and teachers, have not only seen valleys and streams and beautiful views, but they have heard of Bishop Hatto and the Mouse Tower, Bingen on the Rhine, the Lorelei, and perhaps they have even read Seven Little Sisters. If these ideas were all called up as an introduction to the Rhine, they would create a feeling of kinship which would mean a live interest from the beginning.

Again, suppose that we are to study that country in Europe in which William Tell is said to have lived. If the advance work is begun immediately, even though it can be comprehended fairly well, there is serious danger of comparative indifference on the part of pupils. But this danger is easily overcome by recalling what one has heard or read about avalanches and snow storms among the Alps,

about adventures, St. Bernard dogs, Swiss lakes and scenery, the experiences of Jeannette in Seven Little Sisters, etc.

The third danger threatened by the omission of this preparatory step is that the subject under consideration may be only partially understood, or even misunderstood. Rousseau's story, related above, is a good illustration of this danger. It is not an uncommon occurrence for auditors of a lecture to contradict one another flatly as to the purport of the lecturer's thoughts.

People approach whatever is offered them with the interests, pre-conceptions, prejudices, etc., that are peculiar to them. Each one, viewing what is presented from his own point of view, naturally puts his individual interpretation upon it. It is necessary, then, that misunderstandings arise; and school examination papers prove that they arise in abundance. Very few students are so accurate in all their observations and thinking, that their past conceptions are a correct basis from which to interpret new ideas, and yet past experiences are the sole means for such interpretation. Therefore, it is plainly advisable for the teacher, in order to avoid mistakes, to call up, examine, and when necessary, correct past related experiences before advancing into new subject-matter.

From this discussion it follows that there is danger at all times of poor instruction, when a distinct period is not set aside for preparing the child's mind to receive the new knowledge that is offered. There may be either no understanding of the subject in

hand, an indifference or hatred toward it, or a misunderstanding of it. The only safe course to follow is to anticipate such difficulties by careful preparation.

Many teachers, no doubt, would agree to the statements up to this point, but would object to this conclusion. Instead of anticipating such difficulties, they would plunge into the new subject-matter immediately; then if any of the evils mentioned manifested themselves, they would correct them by turning back and recalling the necessary past experiences. This is the usual plan followed, and it is popular because it seems to save much time. But, if related past experiences are to be called to mind at all, no time is saved by doing it late rather than early. Also, if such experiences are the sole basis for new knowledge—as has been shown—the latter has nothing on which to rest, until the former are present in consciousness. Consequently time is lost by the omission of the preparatory step. But there is more than a loss of time involved. If children read Excelsior without interpreting it through many old and familiar thoughts, *i. e.*, without interpreting it at all, they have not only sacrificed their time, but they have lost some of their zest for study. That kind of instruction dulls mental life and ambition. The injury is of the same nature if the given topic, as Gray's Elegy, is comprehended, but is pursued with indifference or dislike. Finally, the situation is not improved when the subject taught is misunderstood, so that corrections are necessary. In each of these three cases the first impressions received are

either unfavorable or wrong; they must be erased and the work attempted again in a better way before good can result. Men and women in their contact with one another learned long ago the supreme importance of favorable and correct first impressions, and they consequently approach one another with the greatest care. When one man conceives a prejudice against another at their first meeting, a strong barrier to their friendship is surely raised. The proverb that "first impressions are most lasting" is accepted as a grave truth by the world of society and business, and teachers have abundant reason for reaching the same conviction. The child who has gotten linear, square, and cubic measure well confused in his mind, is probably permanently weak on that topic. The high school student who has decided that he cannot understand specific gravity is not likely ever to understand it fully. It may not be difficult to rescue such persons from their state of ignorance for a time, but the difficulty consists in making the rescue permanent. All these facts being so well established, it is astonishing how willingly teachers fairly tumble into subjects, leaving first impressions to mere accident. It is true that "it is easy to tear down," but the truth applies to the corrections that one attempts to make, and not to the first impressions themselves. Progressive teachers are rightly throwing tremendous emphasis upon a cautious approach to all topics of study.

We have reached the two conclusions that new knowledge is interpreted through the old, and that, in order that this interpretation may be correct

and effective, it is necessary to recall, collect, and arrange the past experiences bearing upon the topic under treatment. The dangers threatened by the omission of this step are so serious that it must constitute a part of the regular instruction. Now, in planning it, there are a few considerations that should have much weight:

First, the teacher should endeavor to call up *as many related ideas as possible*, especially those which are closely welded to the personality of the child. These latter are the strongest apperceiving notions. Being the ones that are most vivid and active, they can best establish a feeling of kinship towards what is studied.

It is surprising how little value book knowledge may possess for this purpose. One may have read or committed to memory a vast number of facts and still be stupid in his capacity for receiving or apperceiving new thoughts through them. Ordinarily, experiences that have occurred outside of the schoolroom are a surer apperceiving basis than those within the schoolroom—a proof that much school instruction is radically wrong. Arithmetic illustrates this truth. Although that branch is studied so much, the subject-matter is so taught that it often fails to become welded to the personality of the child, and hence, it cannot act as a firm apperceiving basis for the comprehension and solution of the ordinary arithmetical problems that life presents.

Even knowledge drilled into pupils at school by frequent repetition may give very little apperceiv-

ing power. The reason for this can be easily seen by recalling the definition of teaching, namely, the careful fitting of new thoughts to past experiences. Frequent drill upon a point, or constant verbatim repetition, makes no provision for this process of fitting some ideas to others. They are based upon a different conception of teaching, namely, that the kinship between the old and the new, if necessary, is established by mere force, by frequent pounding. But daily repetition of the Lord's Prayer, while it familiarizes us thoroughly with a certain order of words, does not necessarily bring the meaning of the prayer any nearer to us. Many a man would be greatly surprised if his attention were called to the real meaning of the first words, "Our Father," for he has never stopped to reflect upon them. The teacher, therefore, in planning for full apperception can not expect to find strong support in many of those subjects which have been verbally memorized and frequently repeated. Her strongest support will be found usually in the home experiences of the pupil, in the occupation of the parents, in the subjects of conversation among them and the children, in the games among the latter, in books of travel, and in fact in any books that children have read of their own accord. All of these furnish ideas which become so thoroughly a part of the child's life that they are the surest foundation upon which new knowledge may rest. It is evident that success in this step of instruction involves an extensive knowledge of the child's home relations and of his individual nature; that is, his preferences, peculiarities,

etc. From among these home experiences, and those of the school also, in as far as the instruction there has been good, many facts should be drawn which bear directly upon the advance instruction to be given. By calling up as many vivid experiences as possible, the feeling of relationship to the topic in advance will be closer, and therefore the teaching will prove more effective. For instance, children will be attracted to England after they recall facts such as the following: That the Pilgrim Fathers, John Smith, William Penn, came from England; that Charles Dickens, the author of so many good stories, lived there; that sometimes their pocket knives, and very often the table knives, have "Sheffield" marked upon them; that many of our names are English, with *New* prefixed, as New England, New York, New Jersey, New Hampshire, New Bedford; that some in the class have relatives or friends who have visited that country, and who have related certain incidents, etc. That is the skillful teacher who can designate beforehand just how many things each child has known pertaining to a given subject, so that in a few minutes they may all be recalled.

2. The second precaution to be taken is, that no advance work should be attempted during this preparatory step. One cannot well prepare for new knowledge by presenting what is new, just as he cannot erect a building while laying the foundation. There is always a temptation to move forward, and to offer new thoughts in the midst of the discussion of old ones. But the kind of mental activity required

in this preparatory step is different from that required in the advance. In the case of England just referred to, the recalling of such thoughts taxes the memory rather than the ability to comprehend. One is called upon to survey his experiences in order to choose out those which bear upon a given subject. That kind of work must be done by itself. If, in the midst of it, new facts are frequently offered, they are a serious interruption. Further than this, there would be danger that the new and the old way become somewhat mixed with each other in passing frequently from the one to the other. For instance, if children were collecting all the facts they knew about London, and the teacher were to allow some advance instruction in the midst of this work, there would be a temptation on her part to handle this latter as briefly as the former. Review points are naturally covered more rapidly than advance, and there would be a tendency to the same rate of speed in the latter. It is always important for both teachers and pupils to know definitely whether they are reviewing or advancing, because only in that case do they exercise a proper amount of caution in regard to speed.

3. Another important matter is involved in this clear separation of the old from the new. One object of the step is to fix clearly the limits of knowledge upon a given subject. Whenever one sees definitely where his knowledge leaves off, a feeling of need arises, an appetite is generated for more; that is, a receptive frame of mind is produced, and one knows where new instruction should begin. It

is a serious fault with all people that they are not sufficiently aware of what they know and of what they do not know. The limits between the two are so hidden that often, although they know little, they take it for granted that they know much. In consequence they do not feel a need for instruction; or the feeling of need, if present, is not specific, and hence it is difficult to know where to begin. No educator has ever been so keen as Socrates in appreciating the importance of fixing the exact limits of a pupil's knowledge as the condition under which he will be in a receptive frame of mind; but the teacher also is benefited by knowing this limit, for he knows then where his instruction ought to begin—a very important matter.

Queries will often arise while pupils are recalling what they know pertaining to a certain matter, and they will often even fall into friendly disputes over it. For example, a room full of fourth grade children in Chicago once became considerably excited in discussing how the water reached the city from the lake, and what was the purpose of the water tower and engine. The chief result of the recitation consisted in the discovery, both on the part of the teacher and the children, that the latter did not know the things which they had supposed they knew, and the disputes that arose gave point to several advance lessons which were in prospect. The children were anxious to find out who were right in the sides taken, and these recitations were looked forward to as the answers to the problems presented. Such disputes, therefore, are decidedly welcome.

Though, as has been said, no new material should be offered during this preparatory step, children may often run forward in thought and anticipate facts which will be presented later. That is quite desirable. Some anticipation of what is coming is one of the surest signs of good teaching, for it proves that children are in the spirit of the instruction given. Whether their expectations are realized or not makes little difference. Their minds are on the alert, and the outcome will be awaited with interest. Thus lasting impressions are assured.

We have seen that two precautions should be taken in the step of preparation, namely: first, as many related ideas as possible should be called into consciousness; and second, while this is taking place no advance instruction whatever should be given. There is another condition of success in this step which is fully as important as either of these two, namely:

4. The attention of pupils must be centered quickly and fully on the work undertaken. They enter the classroom with scattered thoughts, or occupied with the subject-matter of the recitation immediately preceding. Unless skill is manifested by the instructor in calling up the thoughts that are desirable and in excluding all others, the recitation is lame from the beginning. Commands will not accomplish this object. Even adults possess little ability through mere action of the will alone to rivet their attention upon a certain topic to the exclusion of all else. Much less do children have this power. At the best the latter are able through the force of

the will to turn their attention to a given object for only a moment. If, then, the subject-matter itself does not continue to attract them, their thoughts quickly wander. But much teaching fails to secure this initial act of the will. Even though children sit bolt upright and direct their eyes to the teacher, their minds, like those of adults in listening to sermons, are often filled with matters wholly irrelevant to the topic immediately under discussion. As the recitation proceeds the attention of one child after another may be caught and held by the facts presented, and considerable momentum of thought be attained during the latter part of the hour. This part, then, becomes the most valuable portion; and it would be a great gain if closer attention and greater speed in thinking could be secured earlier, or even at the beginning of the recitation period. The statement of the aim of the recitation to the children can do much toward the accomplishment of this purpose. In acquiring knowledge, as in other occupations, the degree of attention given and the quantity of effort put forth are much influenced by the clearness with which the aim is conceived.

STATEMENT OF THE AIM.

It is taken for granted that the teacher has a definite object in view in each recitation; the contention now is that the pupils also shall aim at something definite. The preparatory step which has been discussed requires that they select all facts in their possession that bear on a given topic and

reject all else. They must do most of this work themselves; the teacher can merely offer them suggestions. But unless they are told in some way what the recitation is aiming to accomplish, they are ignorant as to what they should search for; of course, then, they are helpless and must be led along blindly. Not planning to reach any particular destination, the course traveled is not likely to be noted, and it could not easily be traveled again without a guide. This is an argument against the somewhat common practice of leading children by strange paths to unexpected discoveries. It is an excellent thing to make discoveries, but it is much better that they be dimly anticipated than that they come as entire surprises; students of all ages should know where they are bound; and if they comprehend the situation so well that they foresee what is likely to come next, it is an encouraging sign. Recognizing this truth, teachers very frequently state the aim of each recitation to the class. For instance, it is announced that the work of the hour will consist in finding what per cent one number is of another, or what a pronoun is, or how cities obtain pure water. Or perhaps the teacher merely remarks that they will study about Bunker Hill, about England, or about insects. Such statements of the aim of the hour acquaint the class with the purpose in a general way; but they are very defective, because they are in danger of provoking no thought. Since the selection of the desired past experiences must be made largely by the pupils, that aim is useless which does not immediately catch their attention and set them to work,

and that one is worse than useless which seems to them unattractive and even repellant.

It is evident, therefore, that a properly stated aim must fulfill several important requirements. In the first place, it must be concrete and not abstract. Enough has been said about abstractions or generalizations in previous chapters to show that they follow individual notions. They are empty and repulsive until one has the concrete data upon which they depend. Consequently, the children should not be told that a recitation is aiming to explain some general truth. This does not signify by any means that the teacher shall have no such aim in her own mind. As has been stated already, instruction culminates in generalizations, and the teacher must keep these in mind; but this purpose is a thing entirely separate from the aim which should be stated to the children. For instance, a good Sunday school teacher, in telling about Daniel in the lions' den, would hope ultimately to impress upon her pupils the general truth that God protects those who trust in Him; but the object of the recitation which she would give to the class might well be, "to find out how it happened that Daniel was thrown into a den of lions, and how he was protected from their violence." This is a concrete statement and would naturally arouse the interest of children. It is only this kind, as a rule, which is likely to do that. Therefore, instead of saying that "we will find out today what per cent one number is of another," we could better give such a problem as the following: "A camel lives forty years and an

elephant one hundred and ten years; the age of the former is what per cent of that of the latter?" Also, instead of taking the question, "What are pronouns?" which is abstract, aiming at a definition, it would be better to set up the following object: "Let us see what words you used to take the place of *Columbus* in the composition you have written about him." In place of the question, "How do cities obtain their water?" it would be better to ask (if one lived in Chicago), "Where does Chicago get its water, and how is it brought to the city?" In teaching the fable about the Lion and the Mouse, the teacher may properly aim to show to her pupils that little things may be of much help; but her concrete statement might be: "Let us talk about how a mouse once saved the life of a lion." Thus the first requirement of a good aim is fulfilled by making it concrete.

The second important requirement is that the aim be definite. Little is accomplished by announcing that "We will continue the same subject." And a teacher fixes a very imperfect purpose before her class when she states that they will study "About Bunker Hill," or "About Leaves," or "About Spain," or "About the union of our states." The following aims are much more desirable: "How the Americans outwitted the British and drove them out of Boston," "Where leaves grow; why they are so thin; why they fall," etc. "Why nearly all the large cities in Spain are on the coast," "What prevented the union of our colonies from breaking to pieces at the close of the Revolutionary war." The advantages of the latter

consist in the fact that they are definite enough to concentrate attention upon a particular point.

As far as possible one should state an object which can be accomplished within one recitation period, and consequently some of the aims just stated might need to be divided somewhat. For example, the one in regard to Bunker Hill might be stated thus: first, "Let us study the plan that the Americans adopted to outwit the British and drive them out of Boston;" second, "Let us see how this plan was executed." In each case the class would be expected to review the situation in which each army was placed, etc., before the advance instruction begins: this would constitute the preparatory step.

The third requirement is that the aim be short, simple, and attractive. Strange words would not be acceptable. Hence, with children it would be better to ask, "How do leaves help the tree?" than "What is the function of leaves?" Also, "What changes does the caterpillar pass through?" rather than, "What are the metamorphoses of the caterpillar?" Of course, the simpler the statement, the more easily it is understood; and the shorter it is, the more easily it is reproduced. It is usually desirable that the children reproduce it at least once at the beginning of the recitation, in order to make sure that it is understood. The attractiveness of the aims stated will depend upon the happy combination of what is familiar and what is new to the child. Here is a great opportunity for skill on the part of the teacher. The wording should be such

that the class will feel at least partially acquainted with the topic and still strangers to such an extent that they will be desirous of learning more in regard to it. That aim is weak which does not awaken a feeling of need in the child for more knowledge.

The several requirements of the aim, therefore, are as follows: It should be concrete; definite; simple; short; and attractive. The fact may be well emphasized once more, that these are the requirements of the aim which is to be given to the children at the beginning of the recitation. Such a statement does not mean the giving of the rule first; the rule is abstract, while the aim recommended is concrete. The teacher keeps the rule in mind, since the instruction should finally arrive at this result; but it would be unpedagogical for her to say anything about it beforehand to the children. The form of the statement may vary, being either a declaration or a question or a problem. But whatever form it assumes, it should not reveal new facts in such a way as to deprive advance instruction of its interest. One can easily tell too much. For instance, in regard to the water supply of Chicago, he might declare it to be his aim, "to see how a tunnel brings water to the city and an engine pumps it into the tower;" or, the object might be, "to see how unproductive the interior of Spain is because most of the rain falls on the edge of the great plateau," or, "how we add fractions by making them alike." These statements contain facts that should be revealed in the later instruction; if stated at the beginning, they weaken the instruction which is to

follow, just as the inadvertent telling of the point of a joke weakens the narration of the joke itself. The advantages of an aim that fulfills these conditions are manifest. It renders a recitation easy to conduct, because it furnishes a strong motive for work upon a particular subject. Children become eager to collect and present their related ideas.

But there is scarcely a more difficult task in all teaching than the preparation of an aim that fulfills the few requirements named.

1. The teacher must comprehend clearly the study that she is teaching; also, in planning each lesson, she must distinguish the essential facts from those that are comparatively trivial. The aim that is stated should direct attention to the central idea in a concrete way; such an aim cannot be conceived until the relative value of thoughts is determined and the real gist of the lesson perceived.

2. The teacher must know the contents of her pupils' minds, their emotions, and so forth, before she can frame a statement that will appear to them definite, short, simple, and attractive.

A good aim becomes a standard both to the children and to the teacher for judging the worth of contributions by the former. Since this first step is necessarily conversational, there is always danger that the discussion will degenerate into a conversation that aims at nothing and accomplishes nothing. But, when all are conscious of a fixed aim, reference to it by the teacher or pupils will determine whether or not a certain thought is worth their attention. For example, if the class sets out to show how

water reaches houses from the lake (in Chicago), the child who is eager to tell about the bursting of the water pipes in his home on a certain cold night may be immediately ruled out. This measuring of the relevancy of thoughts is an exceedingly valuable exercise for children.

Also, the development of the will is intimately involved in the statement of the aim in each recitation. "Without aim, no will" is an important dictum of the Germans. That is, when one does not see clearly what is at issue, he feels little incentive for exerting himself. This thought was referred to in the assertion that a definite aim furnishes a motive for effort. But, further than that, if one daily sets up objects to be accomplished and is successful in reaching them, he falls into the habit of succeeding. The energy and perseverance that we show in overcoming new obstacles are greatly conditioned by such a habit. If, as we look backward in time, we recall the fact that it has usually been our lot to fail, courage evaporates. But, if we see our past efforts crowned with success, self-confidence is great and energy is increased. Thus, the past influences the anticipations and the results of the future. That instructor who daily leads her pupils to attain certain ends agreed upon, is accustoming them to success; she is developing in them a belief in themselves which will cause their will-action to be energetic and persistent.

Omitting further discussion of the aim in particular, one merit of this preparatory step deserves still to be noted; namely, it affords opportunity for

frequent reviews of the best possible kind. It is all-important that children recall frequently any knowledge already acquired; otherwise it is likely to escape them. For this purpose reviews are often held at the end of a term, occupying one, two, or three weeks; or, if not then, they come during the term whenever any subject is completed. But in such reviews progress is so rapid that the work is less thorough than when the topics were studied the first time; their avowed object is not greater thoroughness of knowledge, but merely the refreshing of the memory in regard to it. Such work is an injury. Any review that takes place merely for the sake of review, and that does not require new thought, tends to check mental life: mere repetition for repetition's sake has a deadening effect. But how can this evil be remedied, since reviews are essential? This step of preparation is a partial remedy, for it furnishes abundant opportunity for incidental reviews. In approaching any new subject, as England, or the union of our country, or changes in insect life, or the battle of Bunker Hill, those familiar facts are recalled that bear upon it. They are not reviewed merely for the sake of review, *i. e.*, without a motive on the part of the pupil, but because they are a valuable preparation for what is to come. Such work is full of interest. Children feel their strength when recalling an abundance of experiences preparatory to later instruction; their minds are on the alert. Any ideas that are closely akin to the subject are at a premium, whether they come from the study immediately under considera-

tion, or from other branches in school, or from home experiences, from reading, from travel, etc. This careful scrutiny of one's stock of ideas with the purpose of selecting only a certain relevant kind means a review of the old from a new standpoint, with a new element in it that arouses interest; that is the only kind of review that should be tolerated; as it is the kind that this preparatory step is continually bringing about, the latter should, for this particular reason, be highly valued.

Since there is only one way to acquire knowledge, *i. e.*, since all new facts can be interpreted solely by those already in our possession, it is evident that, in insisting upon this preparatory step, we are only demanding that a universal law of learning be applied. If it is ignored, children will encounter much friction and, hence, will learn slowly and with little effect; if it is carefully applied, many of the artificial barriers to their progress are removed, so that they advance thoroughly and rapidly.

The amount of time that this step requires depends upon circumstances. In beginning the study of Spain it might not take more than five minutes to recall the facts that Columbus sailed from Palos, that Malaga grapes come from Southern Spain, that bull-fighting is the national sport, etc. The time taken is dependent upon the number of things the pupils know. The introduction into England might easily occupy thirty minutes. Sometimes it will take even more time than that to collect what the class knows and to mark the limits distinctly between what they are certain of and what they are

doubtful about. As a rule, the aim for any single recitation will cover both review and advance work, and the latter will begin as soon as the former is finished. If a class were to set out to learn the products of Ireland, it might require fifteen minutes to collect the few familiar facts, *i. e.*, that this is called the Emerald Isle, that Irish linens are famous, etc.; then a fuller investigation of the reasons why this is so green an island, or why so much linen is manufactured here, would begin immediately and constitute the advance work.

Now and then, as in literature, history, and in fact, in most studies, the desired related experiences of the past come so easily and quickly into the consciousness of the children, that the advance lesson may begin immediately. But when we recollect that they must pass very frequently from one study to another, and that, in so doing, they are required to direct their attention suddenly to a different subject, we can appreciate the difficulty they find in collecting the desired facts and in entering into the spirit of the lesson immediately. On the whole it is very unsafe to take for granted that the necessary ideas are present; it is ever wiser to take at least a glance at the foundation, and in most cases, to examine it closely, before proceeding to build upon it.

The method here is entirely conversational; it could not be otherwise, since each child is merely offering whatever he can bring to bear. It is well to arrange the thoughts given under headings, and frequently at the close of the step, to recapitulate, in order that the exact amount accomplished may

stand out and the pupils may thus keep their bearings.

This is often called the step of *analysis* as well as the *first* or the *preparatory* step. It is plain that this other name is in place, since in it the children are required to analyze the contents of their minds, or to separate a certain few ideas that bear on a special point from the many others which are in their possession.

Step Two.

It has been shown that two steps are necessary in the acquisition of individual notions: first, the mind should be prepared for the new ideas through the reproduction of the old related ones; second, the new should be presented. The first prepares the foundation; the second adds the superstructure. In the first, those thoughts that bear on a certain topic are separated from the other contents of the mind, hence this is called the step of analysis: in the second the new thoughts are united with the old, hence it is called the step of synthesis. If the former has been successful, the latter will show the effects speedily. Judged by common practice in teaching, this first step seems to involve a great loss of time, for instruction usually begins with the second. But as soon as one begins teaching the new concrete facts, the effect of a good preparatory step shows itself by allowing much more rapid progress than is

otherwise possible. The children, being able to comprehend the topic in hand, and being also interested in it, are much more on the alert than otherwise, and can digest more rapidly whatever is offered. Also it is unnecessary to interrupt the instruction by long explanations, and by detours to hunt up related experiences; consequently the time is occupied more completely by the advance instruction.

The same reasons hold for the statement of an aim in this step as in the step of preparation. That is, an aim will concentrate attention and furnish a motive for active thinking Also, in fixing this aim the same precautions should be observed as have just been discussed.

The form of the recitation may vary greatly. The children may relate a story, or read a selection, or study a map, or draw a flower, or solve a problem in arithmetic, or perform an experiment, or conjugate a verb, or even discuss some subject freely with no formal reciting whatever. However, it is always the second step of instruction so long as the class is employed with new and concrete subject-matter.

But, while there is so much variety in the form of recitation, it is due rather to variety in the subject-matter taught than to difference in the methods employed. In the main, most subjects are treated according to one of three methods, namely, according to the lecture, the text-book, or the developing method.

1. The lecture method is followed extensively in college and university work, and to some extent in high schools. According to that plan, the teacher

imparts knowledge directly, or tells the facts which the students are expected to learn. When it is remembered that lecturing is synonymous with telling, it is evident that the method is not wholly unknown even to teachers of small children. They very often spend five, ten, fifteen, or twenty minutes telling thoughts from the Sunday school lesson, or facts in geography, history, etc.

2. Text-books have long been in vogue and are probably as popular to-day as ever. Recent years, however, have brought very great improvement in their use. There was a time when it was customary for children to learn *verbatim* the text in grammar and geography. It is needless to say that that work was destructive of the best qualities of mind. Subject-matter was often committed to memory that failed entirely to be understood, although a pretence to the contrary was made. In the main, it was the memory that was appealed to, rather than the ability to understand and appreciate.

In more recent years a better class of teachers has required pupils to memorize only the substance of the thought, neglecting the form of expression in the book. They have often even discouraged similarity between the language of the child and that of the book, hoping thus to throw the chief emphasis upon the thought itself.

A third class of teachers also requires only the gist of the lesson, but instead of employing the recitation period for a mere reproduction of the thought, they occupy a good part of that time with discussion, so that the ideas presented in the book may

be comprehended and appreciated: for example, after an outline of facts in connection with the battle of Bunker Hill has been committed to memory, the events are discussed in detail in class until an accurate and vivid picture of the whole is constructed.

Likewise, after the definition of the subject of the sentence, as presented in the grammar, has been carefully studied, numerous sentences are offered by the children and discussed until a fair understanding of the matter is reached. It is evident that this way of using text-books is much better than either of the other two mentioned; by it a greater interest is awakened, misconceptions are corrected, and more effective knowledge is acquired.

3. The developing plan of teaching is one radically different from the lecture and the text-book methods. The teacher who employs it lectures or tells comparatively little to her class, although it is important to remember that she does tell some things outright; neither does she allow the facts that are to be learned to be first presented through a text-book; she prefers to develop them by conversation with the pupils. The nature of this method and its difference from the text-book plan were suggested in chapter two; other examples will reveal its characteristics more clearly still. Frye's Primary Geography, page 108, states the following facts in regard to the British Isles:

"In the British Isles there are vast beds of coal and iron. Near these many great workshops have been built. People of the British Isles weave into cloth fully one-third of the

raw cotton and wool raised in the world. They also produce one-third of the iron and steel. Their ships carry on one-third of the commerce. To the British Isles the United States sends cotton, grain, meat, tobacco, copper, and many other products. Which of these are needed for the workshops? Which are used for food? The British Isles send to the United States iron and steel goods, cotton, wool, and cloth, silk, and many other articles from the workshop. London, on the Thames river, is the chief seaport and railroad center of the British Isles. It is the largest city in the world. The greater part of the trade of the United States is by way of Liverpool, a city near the west coast. Scotland is noted for its iron and steel ships. They are built on the Clyde river near Glasgow."

The text-book method allows these statements to be studied before the recitation period begins and then to be talked over in class until they are sufficiently well understood and impressed upon the mind. In the developing plan the book would not be used at first; the following might be the nature of the conversation that takes place in the class, the teacher beginning thus:

Many years ago it was discovered that there was an abundance of iron ore in England (showing where). Also a great quantity of coal was found in certain places (use map.) So much being true, what might follow? When people have plenty of iron ore and coal, they can make iron and all sorts of things from which iron is made: for instance, nails, screws, hatchets, axes, plows, rails, locomotives, all sorts of machinery, cutlery, iron ships, etc. What effect would that have upon the number of people to be found in the region where these manufactories exist? Large cities would spring up. Thus Manchester, Leeds, Sheffield, Birmingham, Nottingham, and Glasgow, which you find on the map.

Since so many people are engaged in manufacturing, what would be done with the articles that they make? They

cannot use them all at home. Then what will be done with them? Some of them must be sent away to other countries. What, then, will be some of the exports of England? Rails, engines, etc. Through what ports would they be likely to leave England? (Examine map frequently.) It would depend upon the direction in which they were to be sent. If to Europe, they would go by way of Hull, or London; if to America, by way of Liverpool, or possibly Bristol. What effect would this commerce have upon the size of these ports?

If so many of the English people are engaged in manufacturing, and they send so many things abroad, to America, for instance, what are some of the things that they are likely to need from us? Food. What, therefore, would be some of their imports? Grain, meat, tobacco, etc.

But England is an excellent country for grass. Can you tell why? Because of the moist atmosphere and frequent rains. A considerable part of the country, too, cannot well be cultivated; can you tell why, from the map? It is too hilly and rough in the west. Yes, also in places it is too swampy. In many of these regions sheep are raised. What is likely to follow from that fact? Much wool, much manufacture of clothing, since coal is abundant. Hence, increase in size of cities, in importance of ports, etc.; clothing is one of the exports, etc.

All of this conversation could best take place before the paragraph in the book is assigned as a lesson.

Let us take an example from literature, namely, from the story of Robinson Crusoe. Suppose that that point in the story has been reached where Robinson has been shipwrecked and is lying senseless upon the island near the water's edge. Let the recitation begin at that point. It might proceed as follows:

When Robinson came to his senses, he stood up and looked about. What do you suppose he said to himself? "Where

am I?" What would he do then? Recall what had happened. And further? Hunt for his companions. How would he hunt for them? Look for them. And? Walk up and down the shore. More than that? Shout for them. Yes, but he did not find them. What conclusion would he reach? That they were all drowned. How do you suppose he felt? Very sad. Had he any reason for feeling glad? Yes. What? His life had been saved. How might he show that he was glad? By kneeling down and offering a prayer of thanksgiving. And that is what he did. Then what would he do? He would hunt for other people, houses, etc. He did so, but he found none. As time passed what else would he begin to think about? Something to eat. What could he hope for if there were no people? Some wild berries, apples, etc. Where would he find them? Growing in the woods, etc. But he found nothing. Finally, as night was coming on, what would he begin to think about? Where he might stay during the night. And where could it be? He might sleep on the ground. But there was some objection to that. What? He was afraid some wild animals might find him. What else could he do? Build a hut; go into a cave; sleep in a tree, etc. Yes, the last is what he did. What kind of a tree would he search for, etc.?

Thus the story may be taught from day to day, the children telling what might reasonably follow from a given situation. In this case the teacher needs to do very little except to put skillful questions based upon a few given facts.

Let another example be taken from history, namely, the battle of Bunker Hill. We will suppose that the class understands that the British are shut up within the city of Boston, and we state to it the following aim of the recitation:

Let us see how the Americans outwitted the British and nearly succeeded in driving them out of the city. We recall the situation of Boston Harbor, the Boston and the Charles-

town Peninsulas, etc. The teacher then tells the class that there was a hill over on Charlestown Peninsula which overlooked the city. The conversation might continue as follows: A brilliant thought occurred to the Americans in connection with this hill; what could it be? That they would seize it. Why? Because if they had possession of it, they could drive out the British. How? They could fire down onto Boston. But would they destroy their own houses?—remember they built Boston. Yes, they would, if it were necessary in order to drive out the British. How would they go to work to carry out their idea? They would take possession of the hill quietly. When? By night. Describe how. What would they do after reaching the hill? They would throw up earthworks. Describe the earthworks. What question have you to put in regard to the British when it came morning? "How would the British feel when they looked up and saw the fortification there?" They would be greatly surprised and excited. What could they do? One of two things: Abandon Boston, or capture the fortification. They decided to do the latter: how would they do it? Send a body of soldiers over to march up against the fortification. This was done. As the British marched up the hill, would they go slowly or rapidly, and why? What do you suppose the people over in Boston were doing? Probably as many as possible were up on the tops of the houses to see what was going on. The British stormed the fortification, but were repulsed. How do you suppose the people in Boston acted when they saw that? A second repulse followed. But on the third charge the Americans' powder gave out. What would follow? Who had won a victory? Why?

This latter method is often employed in such a subject as language work. For instance, the children desire to write a composition, and some of them are inclined to omit the subject or put it in the wrong place, etc. When this is the case, the following conversation might take place:

Ought you to write any title for your composition, or not? Yes. Why? Because we want any one who reads the

composition, to know what we are writing about. Where would you put the title? At the beginning. Good; just where would you place it? Place it out by itself. Why? So that it can easily be seen. Good; what kind of letters would you use in writing it? Large letters. Why? Because they are plainer and can be more easily read, and so on. Good.

Facts in regard to paragraphing and use of capitals, periods, etc., can be easily developed in the same way.

The developing plan has now been illustrated by examples from geography, literature, history, and language work. Several other examples are suggested later in Chapter XI. Before judging the relative merits of these three methods of teaching, namely, the lecture, the text-book, and the developing methods, it is necessary to determine a standard according to which the worth of each may be measured. Happily this standard is easily obtained from the suggestions in the preceding pages. Since teaching consists in fitting new ideas, feelings, etc., to those that are already at hand, or since it consists in dovetailing the new with the old, or adjusting what the teacher has to give to what is already in the child's mind, that method will prove the most worthy which secures this desired adjustment in the highest degree.

It should be remembered that, if the adjustment has taken place in the proper manner, the good effects of skillful teaching must show themselves; *i. e.*, interest is aroused, the minds of the pupils are active in producing thought, they themselves even have questions to ask in class, and in expressing thought

they use their own words rather than those of the teacher or of the text-book.

Having now this standard of values, let us turn to the three methods presented. Lecturing ordinarily consists simply in offering or telling. The instructor regards the mind as a granary or storehouse and pours into it the knowledge which he has to give. The learner is not the central thought of the teacher, but the latter has his attention directed primarily to the knowledge that he is imparting. Consequently there is little tendency to adjust the new knowledge to what is already present in the minds of the pupils. Past experiences count for little. Hence this method does not arouse a high degree of interest nor lead to mental life. Teachers who adopt it and fall into the habit of "telling" most of the facts that they desire to be learned, are a source of little inspiration. It is properly going out of use even in our colleges.

The text-book plan is essentially the same as the preceding. The difference lies simply in the fact that books appeal to the pupil through the eye by the printed page, while the lecturer, or the one who tells, appeals to him through the ear. So far as the adjustment of the new to the old is concerned, there is less of it in the text-book itself than in the lecture plan. The lecturer, as he stands before his class, necessarily adapts his thoughts to some extent to his individual audience. But the text-book is intended for no individual audience. Alexander Frye wrote his geography in Boston for the average child in the United States. He was as far from think-

ing of any individual child, or even of certain children in a definite community as he could possibly be.

However, the third method of using the book, according to which the substance of the text is studied, and then carefully discussed in class, remedies this serious defect very considerably; conversation allows an excellent opportunity for calling up related past experiences, correcting misconceptions, etc., and thus the new becomes adjusted to the old. For instance, pupils can study Barnes's description of the battle of Bunker Hill, and then discuss it in class until they see a vivid picture, or they can enlarge upon his brief statement of the causes of the permanent union of our states until they have really entered into the spirit of the situation.

Hence, this method can excite considerable interest and mental life, leading to much freedom on the part of the children or students in conceiving questions, and in using their own language in the expression of thought.

But the real question under consideration is, What is the *best* method of teaching? This use of the text-book, while it may accomplish much good, may not be the best way there is. Indeed, that it is not the ideal method, is apparent when it is viewed in the light of facts that are universally accepted in the teaching of mathematics. In arithmetic, for example, there are two parts to each problem, *i. e.*, the answer, and the process by which the answer is reached. Answers in themselves have little value; the worth of the study lies, first of all, in the process by which they are obtained. Further

than that, the thinking necessary for the discovery of the right process, must be done, as far as possible, by the pupil. It is a serious violation of the law of self-activity to tell a child how to solve a problem; he must solve it himself if he is to be much benefited. These are accepted truths; the chief value of mathematics consists in thinking out the processes by which answers are reached, the answers themselves being of minor importance.

Is the case different when we come to geography, literature, history, etc.? According to the method of using text-books just mentioned the reply is "Yes; in these other studies the case is reversed; what we care for in them is the facts corresponding to the answers of arithmetic; the processes are of no value." But why should such a stand as this be taken? If it is really a great pedagogical law that the teacher should not do for the pupil what the latter can do for himself, it should be seriously observed in all subjects. Undoubtedly geography, like arithmetic, is rightly conceived as containing problems and their answers. For instance, the paragraph on the British Isles, quoted above, suggests several important ones, such as the following:

> How would the presence of an abundance of iron ore and coal be likely to affect the occupation of the English people, and also the population of England? What are some of the exports likely to be in consequence? What the imports? Why should England be a wool producing country?

In the part of the story of Robinson Crusoe that has been presented, the text offers the answers to the several questions:

What would Robinson first say to himself when he came to his senses? What would he then do? What conclusion would he reach in regard to his friends? How would he feel? Where would he hunt for food? How would he spend the night? etc.

The text in the history describing the battle of Bunker Hill likewise answers a series of definite questions:

What plan to outwit the British might well come into the minds of the Americans when they began to reflect about Bunker Hill? How would they execute that plan? etc.

From these typical instances it is clear that much of the text in ordinary school books presents answers to questions, just as the key to an arithmetic presents the answers to problems. Further than that, the answers to such questions as have been suggested are as easy of solution on the part of children as ordinary examples in arithmetic. If these statements are true, should not the pupils be allowed to reach the solutions to such questions themselves, and should not the process of reasoning that is necessary for such work be considered at least as valuable as the answers obtained?

But the ordinary text-book method, even where thorough discussion is permitted, does not allow such liberty to the pupil. Instead of permitting him to weigh problems and suggest reasonable solutions for them, it offers the latter to him outright with the expectation that they be comprehended and learned. One result is that the problems themselves are largely omitted from thought. It is a very easy matter to overlook the chief questions involved in

a given text. For instance, the author recently conducted a class through Herbert Spencer's Education. When the first chapter discussing "What knowledge is of most worth," was finished, the students were asked to state the important questions answered. One of the most prominent thoughts in the text is that since science is the most useful kind of knowledge it should constitute the curriculum. This seems at first sight a strange and narrow conception on the part of Spencer, and has caused much opposition to him. But when we understand that he includes very nearly all the school studies under the term science, the situation is not so bad. Undoubtedly one of the first questions to ask in this case is, What does Spencer mean by science? The answer is quite clear. Yet in a class of eight persons who averaged ten years of experience in teaching, only one seemed to have conceived this question. But without thinking the question clearly one can scarcely realize that he has received its answer; *i. e.*, he does not comprehend what is said. Children and adults are alike in this matter; they both easily omit from thought the questions whose answers they are supposed to be receiving. But they should see each problem, and they should even ponder its solution for a while without aid, in order the more fully to realize what the question is, as well as their own weakness or need in disposing of it. Then they are ready for real appreciation of the answer. For example, in addition of fractions, children should face the questions, Why make the fractions alike? and How do it? for sometime before answers are de-

cided upon; otherwise they are too likely to learn the steps involved in the method without being much impressed with the essential thought at issue. So after learning that England produces a great quantity of iron ore, it is well to allow the class a certain time to consider what should accompany this ore, *i. e.*, coal, in order that it may be utilized; likewise they should be given time to reflect upon the products following from iron and coal. If, before they have had time to think, they are told that iron ore cannot be worked without coal, and that the two used together can produce steel, hatchets, engines, etc., they are in danger of accepting the facts without realizing the vital relationship between them; in that case they omit the best part of the thought. In brief, if we want to make sure of real appreciation of knowledge, the facts offered must come as answers to questions that have been consciously felt; only in this way can a close adjustment of the new to the old be assured.

But there is a more fundamental fault still in the ordinary use of books. When a lesson is assigned in a book and then carefully discussed in class, the tacit assumption is that the work of the pupil is to *receive.* He gets what he can by his own study of the text, then the instructor quizzes him in regard to it to make sure that he receives it correctly and that he receives all of it. Now, is it true that the one who is being educated is essentially a receiver? Is that a high conception of education? Is not the child normally a discoverer, a producer? And ought he not to remain a producer throughout life? If this

is the case, should not our method of teaching provide for such activity?

Certainly before he enters school the child is exceedingly active as a thinker; he conceives an abundance of questions and as many answers; it often seems, at least, that he divides his time about equally between questions and answers. To be sure, he receives suggestions of all sorts from those persons about him, but this help is a minor factor in his mental life; he is primarily a producer of thought. The kindergarten is based upon this truth, and the mission of the instructor there is not to tell the child facts so much as to prompt him himself to produce thoughts that are facts. Thus we see one's employment before he enters school proper. After he leaves it and enters upon adult life, the situation is not changed. No matter what the position may be that he takes, he is still not mainly a receiver. Whether he becomes a teacher or a manufacturer or something else, his first duty is to conceive clearly what the problems are that confront him. Much of the time must still be occupied in thinking questions. The teacher must ask himself what his duties are toward the parents of his children, toward the children themselves outside of school, toward religious work in his community. He must ask himself if he intends to be a real student, and, if so, how he can best arrange to carry on study, etc. The manufacturer must go over his field in the same way, mapping out the problems. No one is on hand to tell either of them just what questions are involved in his peculiar situation. He may receive help on par-

ticular points from various quarters. Now and then an angry parent brings unexpected light as to a teacher's duty in a certain direction. But, in the main, each individual must depend upon himself to know when he has covered the field and has seen all of the important problems involved in his work. If some of them are omitted, he must suffer in consequence. Many a business man discovers too late that he did not ask himself questions enough in regard to a proposed project.

After the problems have thus been marked out in thought, the solution of the same must be reached. Again, each one must depend upon himself; he may receive help and advice, but he himself must decide whether the advice is good or not; he must do his own thinking all of the time, and his success is dependent upon the care and completeness with which it is done. So far then as the thought side of adult life is concerned, it is not essentially different from that of the child; one must spend his time upon problems and their answers; each one, though he may receive valuable facts from many sources, must conceive his own problems and his own answers. We find, then, that originality is natural to childhood and a necessity in adult life; each human being is by nature, and also *must* be, a discoverer, a producer of thought.

Now, proper preparation for life requires that those good qualities that are natural and necessary be encouraged by training; how, then, shall the school encourage the mental activity involved in thinking questions and answers?

Suppose a boy has passed through many text-books in the grades, in the high school, and in college. Suppose even that thorough discussion followed the study of the texts; has he received the kind of training necessary? Has he received abundant practice in mapping out the chief problems necessary to a certain topic? Has he had the same practice in reaching their solutions? And is he in consequence an independent thinker? Ordinarily the answer must be, *No!* Books are not planned with reference to this thought. The ordinary conception is that if one knows plenty of facts he will naturally do the thinking necessary to their proper use; hence, the books offer these facts. But the result is that the learner occupies his time in taking in ideas of other people rather than in giving forth ideas that have originated with himself. In that way education, viewed from the teacher's side, comes to mean putting in, pouring in, while the derivation of the word, *e* and *ducere*, means to draw forth, draw out. The learner, then, becoming a receiver, is made relatively passive, while his nature and the needs of life require that he be intensely active.

A hint as to a better method is given by the children themselves. When they are taken to a museum to see Indian relics, or when they are allowed to witness simple experiments in physics, they dislike having to stand back and merely look on; they have an insatiable desire to touch and handle the relics, to help arrange the apparatus. They are so constituted that they can learn better if they are allowed this activity. They show the same attitude toward thought

materials. That is, when there are no relics or apparatus present and when they are dealing only with thoughts in the presence of their teacher, it is still unnatural for them to stand back and merely behold the thoughts that she or the books present; they want to join in and help in the production of thought, and if this liberty is denied them, while they may learn a great deal, the amount is not what it might be and is not welded to their personalities as it should be. Hence the conclusion is reached that even the text-book method that provides for considerable discussion is seriously at fault; it contains mainly answers, thereby largely omitting questions from thought. And these answers, many of which the child could discover for himself, are furnished to him before he has been allowed time to think them out himself; it is, therefore, a systematic violation of the law of self-activity. But in order to comprehend thoughts, or to adjust the new to the old properly, one must conceive clearly the problems involved, and he must reach these problems and their answers largely through his own effort, *i. e.*, through his own self-activity. Inasmuch as the text-book method does not fulfill these requirements, it does not secure a high degree of adjustment of the new to the old.

The third method under discussion, that of development, avoids these errors. It makes both questions and answers prominent, and it puts the questions to the child *before* their answers have been presented. More than that, the child is expected to conceive these answers without much help; he is systematically required to make discoveries, to judge what

might reasonably follow from a given situation, to put two and two together and declare that they make four. Often, too, he finds it possible to discover the leading questions involved, as well as their answers; he must often state what should be the next question to be considered, and by practice in such thinking he can become skilled in conceiving both problems and their solutions. Thus provision is made for adjustment of the new to the old by the large amount of self-activity allowed by the practice of thinking questions and answers.

Another feature of the developing method that is worthy of notice is the fact that it provides for a close sequence of thought. Any text-book ordinarily makes a jump from one point to another and omits many of the necessary connecting links of thought. For instance, most text-books in United States history do not state clearly why the Americans wanted possession of Bunker Hill. In the latter part of the Revolutionary war the fighting was removed to the south, but books often state the fact of removal without going into details. So it is usually; the text contains an outline of events or leading thoughts; it is merely a text, *i. e.*, it presents the chief topics without building the connections between them. It hasn't space to do otherwise. The developing plan, however, provides for short steps in thought; the children themselves are expected to take the steps, and hence there cannot be broad chasms between them. The result is that close series or chains of thought are established, and because they are thus so closely connected they are brought into intimate relation

with the child's way of thinking, *i. e.*, the new is closely adjusted to the old.

It should be remembered that the basis for the many judgments passed by pupils is their past experience. Past knowledge furnishes the premises from which new conclusions are drawn, hence the relation of the new to the old is close indeed. We see really the spirit of the first or preparatory step carried into the second; the developing or conversational method reveals the learner's doubts and thus makes constant provision for adjusting the new to what is already present. Of course, it is often difficult for pupils to enter into the spirit of a situation and then they make ridiculous mistakes. One little girl, when asked how Robinson Crusoe might secure more clothing, suggested that he would telegraph home. But the fact that the other children laughed, threw the desired emphasis upon the constant exercise of good judgment or good sense. But when pupils do enter into the situation, they not only conceive reasonable answers to questions, but, as said above, they anticipate the questions themselves. For instance, in the story of Crusoe, thoughtful pupils will name many of the chief topics that must be considered, long before they are reached in the actual instruction. They must have entered into the spirit of the story to do this, and to be in the spirit of any subject means real apperception.

Experience shows that the developing method can excite much interest and thoughtfulness, and secure from the pupil a frank expression of his ideas in his own words.

Of the three methods of teaching under discussion, this last is undoubtedly the one by which the closest adjustment of the new to the old with the accompanying benefits is secured; it is consequently the best. This is the method that was employed by Socrates. He was convinced that the human mind could discover much truth through its own energies, provided the instructor knew how to guide it properly; accordingly teaching meant to him not the telling of what the instructor knows, but rather the asking of such questions as will guide the thought of the student and draw him out (educate) to a free expression of his own ideas. The new conclusions reached in the course of the conversation constituted the knowledge acquired. An example of his teaching is furnished in a later chapter.

Notwithstanding the superiority of the developing method, some facts advise strongly against any attempt to make exclusive use of it.

In the first place, not everything can be developed. Beyond much doubt there are many facts in every study that should be reached through discussion rather than told outright. But there are also many in some studies that could not possibly be so reached; and there are others that, although they could be developed by considerable ingenuity, are better told outright. Hence, any one who makes exclusive use of this method has become an extremist.

In the second place, this is an extremely difficult method to follow. Just as the sharpest tools must be handled with the greatest care, so this plan

of teaching must be skillfully applied, otherwise astonishingly meager results or even serious injury may follow. On that account inexperienced teachers should not attempt to make use of it exclusively, or even mainly; they should accustom themselves to it slowly, making trial of their strength here and there as opportunity offers.

Thirdly, the intellectual treasures of the past lie locked up in books. Proper school training unlocks this storehouse by accustoming one to their intelligent use. Hence, books must be in constant use in the schoolroom, and even text-books must occupy a prominent place there. It follows from these facts that neither the text-book nor the developing plan is worthy of exclusive adoption, but that each should be accepted to some extent.

A careful examination of the developing method convinces us that the right kind of conversation is the best means of thoroughly welding new thoughts and feelings to those already in the child's possession, and an examination of text-books shows that they tell many things that could far better be discovered by the children without the aid of any book. Hence, conversation for the sake of developing facts should be prominent in all school instruction; and, since text-books, if used to introduce the topics, would often deprive this conversation of its point, their perusal should in such cases follow rather than precede the discussion itself. The last statement is a very important one, indeed. It is a sin for the book to introduce the class to the French and Indian war by naming the "five objective points," when the

class itself, by taking thought, could locate approximately the chief points where fighting would take place. Further, if they are prepared for the work, they know that fractions must be alike before they can be added; they can anticipate some of the dangers accompanying Midas's golden touch; they can state many of the evil consequences of our lack of a national coinage system. In such cases it is well to pause in the use of the book in order to give them time to use their own thoughts first, and thus do original thinking. In some studies recitation after recitation can well employ only the developing method; this is notably the case with Crusoe in the second or third grade, with much of the nature-study throughout the grades, with pedagogy in the University, etc. In other subjects, as in history, geography, arithmetic, etc., where text-books are needed, discussion can both precede and follow the study of the text on a given point; in either case it might occupy only a few minutes, or a whole recitation period, or even more, according to the nature of the subject-matter and the ability of the children and of the teacher. When a whole chapter has been practically developed in class, it is still well to turn to the book in order to review and summarize what has been accomplished; hence the book is of great value even where most of the time is given to development.

From these remarks it is clear that we do not advocate using the book entirely or giving it up entirely; on the contrary, the text-book and the developing method can be employed together and

alternate with each other as occasion demands. School instruction should certainly culminate in the ability to use books properly, but that does not necessitate abundant use of text-books, especially early in school life, or even exclusively at any time. One trouble with many people is that they began text-books so early in school and followed them so closely that they have never learned to distinguish their own thoughts and opinions from those of the books; in fact, they are scarcely aware that they have opinions of their own. They would have been much stronger had they been often entirely freed from books and had much daily exercise in giving expression to their own thought entirely untrammeled by remembrance of any text. The present common use of text-books in school results too often in slavery to books or loss of independence in thought, rather than in a mastery of books and ability to use them properly. This fact should be borne in mind, for it greatly affects one's attitude toward discussion as a means of teaching. Books must be provided for; they may be used to review ground covered in conversation, to continue investigation of topics that have been already introduced and partially treated, or finally, among older pupils, to further information and increase culture generally. But from what has been said, discussion should be prominent in all good teaching, from the kindergarten through the University, for it is essential to the preservation of originality and independence in thinking. With the understanding, then, that the developing and the text-book methods are to be

combined, but that discussion is always to be prominent, we proceed to consider how the latter might be conducted.

Since, as declared above, it is by no means easy to lead a discussion properly, some of the general rules that would keep it within bounds and render it effective are necessary. The most serious danger is that conversation may wander, so that pupils will feel lost and nothing definite will be learned. But there are several important safeguards against this danger. The first is a clearly defined aim stated to the class. If both teacher and pupils set out to reach an end definitely fixed, they are able to measure by it the relevancy of any thoughts suggested. Quite often the teacher can protect herself, when a child makes a suggestion without reference to the topic under treatment; by asking the class, "What did we set out to accomplish? Will the suggestion just given help towards that end?" If the class reply, "No," the difficulty is immediately overcome. Such treatment of wandering thoughts is very valuable, too, for thereby all the pupils are drilled in measuring the relevancy of their ideas. They are trained to select with care the suggestions that they wish to make,—thus their judgment is exercised in a telling manner; hence a clearly stated aim is valuable, whether we wish to occupy only ten minutes or a whole recitation period in developing one or more thoughts.

Aside from an aim, the teacher will also be greatly aided by a clear outline of her leading questions. If she realizes what her two or three or four main prob-

lems are for a thirty-minute period, she has practically three or four sub-aims fixed in mind, and they will keep her upon the right road in the subdivisions of the recitation, just as the large aim for the entire period guides her for the whole recitation. A clear statement of the leading questions on a given subject is essential to the fullest preparation for teaching it. Very often good instructors prepare for class work by arranging their subject-matter in topics and designating each by an appropriate heading. But a great amount of indefiniteness is concealed under mere headings. The division of a subject into topics with a suitable name for each, can be made by one who possesses no skill whatever as a teacher, but the proper wording of the corresponding questions that would actually be put in class cannot be given by such a person; that requires an intimate knowledge of children's interests, of their vocabulary, etc. This means that the method of treating a subject has not yet been determined when one has decided only upon his topics. Training teachers in the model departments of normal schools receive remarkably little information about the actual method to be employed by student teachers, when the latter present to them only a careful outline of the subject-matter to be taught. The difficulty here involved has been already suggested in the discussion of the aim of the recitation. In that connection it was stated that the aim might often take the form of a question or problem, and it was shown by example how difficult it was to find a suitable wording for it. But, as in the case of the aim, so here, the rightly

worded question plants a topic within reach of the children, within their experience and interest. Here we see again how adjustment of the new to the old is secured.

Another example will make the matter clearer. In the study of the sugar tree the chief headings may be *shape of tree, roots, stem, leaves, etc.* Some of the minor ones may be the color and form of the leaves, the density of shade, the superiority of the hard maple over the soft maple, etc. But with such headings little preparation has been made for actual teaching, for no suggestion is given, thus far, as to how these matters will be broached in the presence of the children. Since the facts cannot best be told to them outright, some question must be conceived which will be broad enough to include several facts and sufficiently suggestive to provoke thought. Let this be the one: What reasons can you give why the hard maple, or sugar tree, is so well liked by us all? The replies will come that it is beautiful, the color of the leaves is so green; also, that the shape of the tree is pretty, it is so regular, or symmetrical. Further than that, on hot summer days it gives an excellent shade, denser than that of many trees, for instance the soft maple. This is partly because the leaves grow on the stems in the middle of the tree, as well as outside where the sun can easily reach them. Also, the tree can endure more than many other trees. The wood is harder than that of the soft maple, hence the name hard maple; and the tree branches differently from the soft maple, so that heavy winds, sleet, etc., are less likely to break

and tear it to pieces. If this part of the recitation proves especially interesting and profitable it is to a considerable degree because the leading question is broad enough to include several answers under it, and it is so stated as to elicit much thinking. Further questions might be the following: Where does the tree get its food? What part of the roots acts as mouths for receiving the food? If the little hairs are so important, what would you say about transplanting the trees? Where then could the water be best poured for watering trees? Why are these roots and rootlets so knotty and irregular? Where does this water that enters the roots go? Through what part of the trunk does it pass? Why are the leaves so thin and broad? How can the leaves prevent too much evaporation? Why are the petioles of different lengths?

The fact that it requires very careful thinking to word such questions as these even after one is well acquainted with his subject-matter, is proof that they are an important advance upon the arrangement of a subject by mere headings. But the teacher who approaches her class with that preparation, *i. e.*, with her questions clearly marked out, is partly protected from wandering. A clear question requires a definite answer, while both the amount of matter included under a heading and its nature are uncertain. Consequently both teacher and pupil are more likely in the former than in the latter case to know when they are on the right track and when they have finished.

Another important safeguard against wandering is closely connected with the one just given. If the

prominent questions which compose the outline form a necessary sequence, a teacher is much more likely to be reminded at the right time of what ought to come next than would otherwise be the case. A great law of teaching is here involved; namely, that of correlation. It demands that the different studies be closely associated with one another; or, interpreted in a larger way, that all ideas taught should fall into a series or a network, so as to be closely bound to one another. Applied to the single recitation this principle is often referred to as the law of sequence. According to it a lesson is by no means fully prepared when the teacher has fixed in mind several topics that she wishes to cover; she may even have stated these topics in the form of definite questions; but preparation is still very defective unless these questions are brought into a very close sequence either logical, or causal, or at least natural. In following the topical method in United States history, teachers often take the events of an administration as the chief points to be considered; but it happens not seldom that there is no close sequence between these points, and hence the law of sequence is violated. In the preceding examples of the developing plan of teaching, the leading questions in regard to England, and in regard to the sugar tree, were arranged, so far as possible, with reference to this principle. Let another instance illustrate this point further. Suppose the fifth grade in geography has learned that a very large part of Spain consists of a plateau with low land around the edges; the series of questions following may form a close sequence.

If the plateau is so high, what will be the effect upon the moisture-laden winds that strike the edge of the plateau? Since a large portion of the rain will fall upon the edge of the plateau, what would you say about the interior of this highland? If little rain falls upon the interior, what would you say about the size of the rivers, the abundance of grass, of woods? If the rivers are small, etc., what about the population of the interior? It is plain how such a closely connected series prevents wandering; for, when it is once begun, it is very easy to proceed; each question reminds the teacher, and often the children, of the thought that should be next considered, and hence there is little temptation to wander.

Thus far three safeguards have been suggested to prevent the danger of wandering, *i. e.*, a clearly fixed aim, an outline of topics in form of questions, and a close sequence among the questions. The presence of this aim and of such questions in sequence invites both teacher and pupils to measure the worth of all contributions from the latter and to reject what is irrelevant.

In addition to these three means of protection it is advisable to require frequent recapitulations. These may take place perhaps every ten or fifteen minutes, according to the ability of the class in this direction. Such recapitulations or summaries call for reflection in regard to the ground that has been covered, and, if the conversation has been wandering, many are likely to be made conscious of the fact. The instructor, at least, will be placed upon

his guard. They are made very easy, too, if, as important thoughts were presented, brief headings for the same were placed upon the board. Some of the better scholars should first be called upon to reproduce all that they can without interruption. Then, after necessary corrections are made, others should follow; thus, the demands made upon each are tempered according to his strength.

A very important principle of teaching is involved in such recapitulations, and it applies as much to text-book instruction as to the developing method. In each there is a tendency to become so immersed in details that general bearings are lost. This is seen in history classes that take "seven pages in advance and seven in review," but never find time to do more than memorize each day's lesson; it is seen in all studies where the advance is so constant that students do not halt to breathe and look about them to see what they have accomplished. This principle is sometimes known as the law of absorption and reflection. According to that law there are two kinds of mental activity required in study. The student employs the first when he becomes absorbed in the study of individual facts. He gives himself to certain details to such an extent that attention is entirely withdrawn from other ideas. He employs the second when he withdraws his attention from these individual facts and directs it to a much wider range of thought; when he rises high enough to take a broad survey of the field that he is studying and to see the relationship of topics to one another. Often in traveling one crosses a

valley, and then ascends a hill; he crosses another valley, ascends a mountain, etc.

There are heights and depths in study as well as in travel. One should plunge into details, and he should rise again to a point where he can see the ground that he has covered and its relation to other things; that is, he should rise to a point where he can secure a broad view. In other words, he should have periods of absorption and of reflection, and these two should alternate just as do hills and valleys. In any recitation period provision should be made for this variety of thinking, so that after a very careful study of details a general survey of the whole may be secured. The recapitulations which were mentioned as being so important should be planned in accordance with this demand. If the class is making rapid progress, there could well be two or three such summaries within thirty minutes. By that means children can get a frequent view of a long stretch of the road that they are pursuing, and thus keep in mind the general direction in which they are traveling. This law of absorption and reflection is sometimes called the law of mental respiration. Just as we alternately inspire air and then expel it, so absorption in details and reflection in regard to them should alternate. The perspective thus secured affords valuable aid in the proper classification of one's knowledge. If, after having studied for fifteen minutes, a pupil is required to give a heading for the matter covered and to recall the gist of the thought; and if the same thing is done for the work of the hour as a whole, for that of the

week, month, etc.—if this is done, he is allowed to withdraw far enough from particular facts to distinguish which are relatively unimportant and which are of the greatest value. Ordinarily in the progress of the study of details there is not sufficient opportunity given to distinguish their relative value. Children are too immediately occupied with them; that is, they are too close to them. But when at frequent intervals pupils look over the territory traveled, they have an excellent opportunity to view the different points in the right proportion. Thus we see that the classification of knowledge is secured and the danger of wandering avoided by the application of this law of absorption and reflection.

But in all teaching where attempts are made to dispense, to a considerable degree, with text-books, there is danger of trying to develop things that can never be developed. For instance, suppose a teacher remarks to a class, "Let us talk about a certain bird. Can you tell me what one I have in mind?" In that case she is putting to the children a question that they have no means of answering. They may name all the birds they know and finally hit the right one; but it is not instruction in which anything is unfolded or developed; it is no real instruction at all, but only an injurious exercise in guessing. The conversational plan of teaching aims to develop the judgment of pupils; hence, the questions asked must be of such a nature that they may reasonably be expected to answer them. If the teacher asks the third grade in what manner Crusoe might salt the rabbit that he caught, she should do

so with the belief that a reasonable amount of thinking on their part will produce a certain reasonable reply. To be sure, they know nothing about any salt mine on the island, but they know that the sea is salt, and if some one replies, as was the case in one class, that Robinson would dip his meat into the salt sea, or that he would allow some sea water to evaporate and use the salt left, the answers should not be unexpected by the instructor. But when pupils lack data from which to draw a reasonable answer, the question should not be given. As a rule no answer should be tolerated for which a fairly good reason cannot be offered. We see, then, that the developing plan is dangerous in that it very easily encourages the tendency to guess, and thereby encourages thoughtlessness instead of good sense. Where teachers are in much doubt as to the possibility of developing a thought, the safer plan by far is to tell it frankly or approach it through a lesson assigned in a book.

Experience with children and a careful study of them will gradually reveal to the teacher what is probably capable of development. In times past teachers have undoubtedly erred in supposing that almost everything new must be *given* to the child in order to be comprehended and learned; hence their immediate resort to "telling" and to text-books. It has been the intention in the numerous examples given above to show that much can be unfolded through conversation, but not all. In connection with England the fact was given that an abundance of coal and iron ore was found in that country. That being the case, it was asked what might fol-

low. The children, knowing that Crusoe had been ship-wrecked and lay senseless upon an island, were asked what he would be likely to say and do when he came to his senses and stood upon his feet. It was told to the class that a hill unoccupied by either the British or the Americans overlooked the city of Boston, and the children were asked to suggest the plan that might occur to the Americans in regard to it. Thus even in these instances, although many things can be developed, some must be told. In other topics it is often necessary to tell much more or to make much use of the text-book.

Although it is often declared that the world has made its progress by passing from one extreme to another, yet we should guard against going from the old plan of telling all to the new plan of developing all.

Another objection to cutting loose more or less from text-books for free discussion is that it greatly taxes the teacher's governing power. Pupils are not only likely to offer thoughts that are irrelevant or unfounded, but they may feel inclined to make suggestions that are purposely foolish. More than that, if the instruction is interesting, they may all desire to speak at once, and thereby produce confusion. But these dangers are always present whenever instruction is lively and interesting. The way to make government quite easy is to render pupils stupid and passive; but no one desires it at that cost. In the main, the more children are interested in their studies, the more tractable they are; and in as much as pointed conversation increases interest, it aids in securing fair order.

Some teachers oppose the conversational method, in whole or in part, because it consumes a great deal of time, or is too slow. They argue that so short a time is spent in school that it is necessary to cover ground much more rapidly. But let us see what are the causes of this slowness. In the first place, as we have seen, the children themselves are to conceive some of the problems from day to day in each study, and they are to find solutions for a large number of them. The law of self-activity requires that they do this work rather than have it done for them. Hence, although it occupies much time, it can not properly be omitted, Second, the developing plan of teaching any subject allows the expression of any doubts, misconceptions, objections, etc., on the part of the children or students. That also takes time, but the law of apperception requires the expression of such things in order that the new may really be welded to the old in a proper way. Hence, while such discussion occupies much time, it also can not properly be omitted, Third, the developing plan requires that many links be inserted in the chain of thought that would be ordinarily presented, so that there may not be any broad chasm between any two points. The law of close connection or close sequence in thought requires the insertion of many facts, so as to present a situation that is fully and easily comprehended. Hence, although this also requires much time, it can not properly be omitted. We see, then, why the developing plan of teaching requires much time, for these points mentioned cover the chief characteristics of that method. But which

one of them ought to be omitted in order to save time and cover ground more rapidly? If no omissions are in place, then the method is not too slow.

To be sure, compared with the progress ordinarily made by the text-book method, this other way is extremely slow. But any one will admit that ordinarily we pass over subject-matter altogether too rapidly, and we should bear in mind that real progress is to be measured not by the ground apparently covered, but rather by what the child actually gets in such a way as to make it his own. Teachers are too often inclined to get over territory, measuring their progress by the amount covered; but if the rate of progress were determined by what the child really digests, we would necessarily go very much slower, for it takes a large amount of time really to digest a single important thought. This can be seen from the fact that there are several stages in the digestion of a thought. First, it must be seen clearly from a single side, then it can be recalled by the memory with some effort. After it has been seen from several sides, however, one really begins to feel the force of it; then it can be recalled by the memory with some ease. Only after it has been seen from many sides are we able to recall it with such ease and feel its force to such a degree that we can begin to use it, and it is even some time after that before we begin to use it with ease and feel that it is fully our own. Now, a good deal of instruction consists in giving a single view of an important thought. That is seen in lectures. A lecturer often presents a thought clearly in a few sentences, and

then moves on. An attentive audience sees the thought clearly for an instant, and then something else takes its place; and the great danger is that even in an excellent lecture one will be given only glimpses of fine things. Now, the only condition under which any topic is really digested is that the mind dwell upon it for a long time. It must be looked at from one side, and then another, and then another. It must be reflected upon at length in order that one may become saturated with it so that it seems a part of him.

The developing plan of teaching, by allowing different persons to be heard from and to express their thoughts from different points of view, provides the necessary time for the mind to dwell upon a matter and see it in various lights; in other words, it provides for real digestion of thoughts. When we reflect that probably nine-tenths of the information acquired in school is forgotten, and that only a portion of the remaining one-tenth has really been digested in such a way as to be a power within us, the need of a slower method of instruction becomes apparent. If we were to cover ground one-half as fast, and spend twice as much time talking about a topic, we would learn much more effectively than we do at present. Enlightened teachers generally admit this statement as a fact, but they are controlled by the habits of the past when it comes to actual instruction. It must be admitted that the developing method is slow, but that is no objection, for it is what teachers need. Since the ordinary tendency is to cover ground altogether too rapidly,

any method which puts a check upon teachers and secures greater thoroughness is to be welcomed.

The objections that have been stated to an abundance of discussion in the classes of all ages are four; *i. e.*, the tendencies to wander, to guess, to grow disorderly, and to progress too slowly. Although there are means of overcoming them, the objections are sufficiently weighty to prevent the majority of teachers from depending mainly upon conversation as a means of reaching new knowledge.

A few instructors can limit themselves almost solely to that method, at least in some subjects, and make their nearest approach to ideal teaching. But such effective work is the result of much native ability and extensive experience, as said before. It is wise for the majority to depend in a considerable degree upon text-books in most studies. But in no branch should a text be so closely followed that the recitation period is spent simply in reproducing the contents of a book; that is slavish work, taxing chiefly the memory and giving no guarantee of real assimilation. Even where the book is in regular use, some of its statements can well be anticipated and developed by conversation before they are assigned in the book itself; many others need to be followed out in detail far beyond the meagre account in the text. Hence, even where the book is used, the recitation period should be occupied, not with catechetical questions on the text, but with discussions either of problems whose solution will be found in the text later, or of statements already met there, but needing much amplification in order to be appreciated.

Since discussion is to play so prominent a part in all good teaching, it is well to realize that the skill required in conducting it is shown first of all in the value of the questions asked. It is necessary, therefore, for the ambitious teacher to become a careful student of the art of questioning. Especially must she consider the purpose of the questions. Ordinarily they aim merely to test the presence of knowledge supposed to be already acquired in the lesson assigned, as map questions in geography. But those necessary in the developing method cannot aim primarily to test the memory in this way; they must provoke thought first of all. Hence, instead of catechetical questions, or others that can be fully answered by a yes or a no, or by memorized statements in the book, those are to be put which are suggestive enough to arouse thought and broad enough to call for even a series of thoughts. The preceding pages offer numerous examples of this kind. One of their merits is that, while they provoke or stimulate thought, they at the same time test the presence of knowledge. Socrates resorts continually to questions that fulfill this double function. In his conversations with young men he tests what they know while spurring them on to the most careful thinking.

Throughout this chapter we have been considering the method of presenting new individual notions or concrete facts. One object is to offer them in such a manner that a vivid picture will be produced and a deep interest be aroused. This demand for vividness should ever be borne in mind by the teacher. Children should practically *see* Minneapolis with its

waterfall and flour mills, with its wheat-fields to the west, and its farm products of all kinds coming and going. Likewise Midas, and his little daughter coming to kiss him in the early morning, should stand out distinctly before them; so the different stages in the lives of certain insects should be accurately pictured; and the several colonies quarreling and fighting with one another after the Revolution should appear almost as clearly as disagreements on the playground are recalled. The developing method, with its searching, thought-provoking questions, is to be applied to this end. But other means, also, are to be kept in mind. One of them has already received emphasis, namely, the past related experiences. Indeed, the developing method is made possible only through these. In addition to them it is important to produce in class, so far as possible, the object talked about. It has taken centuries of progress to realize this need. During many generations following Columbus's discovery of America people had an unlimited faith in the power of words, whether the words represented familiar ideas or not. They even ignored the mother tongue in approaching a foreign language, learning Latin through a grammar that was entirely in the Latin language. Finally Comenius advocated pictures illustrating the idea symbolized by the word, and in consequence his *Orbus Pictus*, or picture book, issued in 1657, became one of the most noted school books ever published. By the help of such illustrations one could get some notion of the object mentioned even though he had never seen it.

Another century passed before Pestalozzi was born, who partially convinced the world that even pictures were inadequate and that teachers must make it their practice either to bring things into the school room to be studied, or to take the children out to see them. The lesson is not yet half learned, but here and there are instructors who do regularly bring insects and flowers into the school, who visit museums with their classes, and even go on lengthy excursions with them. They aim not only to make their nature study concrete thereby, but other studies as well; they visit museums to see historical relics, they make excursions to see actual valleys, they use objects to show how real fractions can be added; they do all this in order to secure living pictures of what is studied. There is as much difference between seeing a thing and merely hearing about it, as there is between visiting Paris and listening to a description of it.

But unfortunately it is often impossible to see and handle the objects themselves. In that case there are several partial substitutes; among them are models, maps, photographs, and lantern slides. Any school could make a valuable collection of pictures by simply cutting them out of newspapers and magazines, if from no other source; thus waterfalls, industries, beautiful views, etc., could be presented in concrete form.

But there is another substitute for the real object that is especially worthy of mention; it is an abundance of details. To be sure, there is often a strong opposition to them, and it may be well founded, for

there is a kind of details that is a nuisance; the dates of most battles, the number of men engaged in them, the bends in a river, the exact height of mountains, the several uses of the present active participle, the number of seeds in an apple, the degree of longitude in which most towns on the earth are situated, are fair examples. These are not the kind meant. There is another kind that is really essential and they are illustrated in the story of Crusoe, where little incidents are related without number in order to build up a vivid picture; they are necessary to the comprehension of Minneapolis as a trade center, for one must know the kinds of grain shipped into the city, the many railroads carrying it, the number of flour mills with their capacity, etc., before he begins to see what is meant by trade-center. Numerous detailed events in the life of the milkweed butterfly are likewise necessary before one can get a right conception of its metamorphoses.

In tracing the origin of our constitution it is insufficient to read that New York, New Jersey, and Connecticut fell into disputes and threatened war. We want to know what they quarreled about. So it is not enough to call attention merely to the fact that there was no national coinage and hence that trade was hindered; we would like to see in detail some of the ways in which it was hindered. Only by the help of abundant little facts are we likely to enter into the spirit of such situations and understand them properly. These details are trivial in themselves, to be sure; but it is through them that the child becomes so absorbed in a subject that he

fails to hear you when you speak to him; it is through them that he approaches perfection of understanding and interest. They are, then, worthy of attention. The thing to be emphasized is a selection of the right kind. Those should be chosen that are essential to a clear, attractive, and correct picture. Those that are irrelevant to this end should be cast aside, while those that seriously affect the data from which conclusions or generalizations are to be drawn should receive abundant attention. The biographer throws away many incidents in the life of his hero because they contribute little to any important end, but he depends upon others to make important characteristics clear and to render the biography attractive. The popularity of Fiske's "Critical Period in American History" is due largely to its exciting details. As said, then, the first precaution to exercise is to select the details with care. This being recognized, the next should be to provide an abundance of them. Meager data can never produce a complete picture, but a great number of them, well chosen, can make permanent impressions.

The vividness of mental pictures is dependent finally upon the extent to which thoughts are allowed to find expression in physical action. During the first six years of life the child acquires a large share of his education. Each year he probably learns more than he does during any later year of life, not excepting his college course. What are the means by which this great result is brought about? Two characteristics of these six years are especially noticeable. One is that he is almost constantly

employing his mind. He propounds questions, finds their solution, makes observations of various kinds, etc. But during all this time his physical activity is as striking as his mental life. He is using his back, neck, legs, arms, hands, etc., as abundantly as his mind. Undoubtedly a partial explanation is that it is natural for him to do so. He is so constituted that if he did not exercise considerably he would scarcely be able to contain himself. Hence such physical action may be considered restful. But it is more than that. It is not an activity which merely accompanies mental action, being unrelated to it, but it supplements this action, it helps toward clearness of ideas. If a child says that a neighboring boy lives directly across the street and points in that direction, or, in general, if one accompanies an idea with the appropriate gesture, these two kinds of action make the idea clearer to the speaker, and to others, than one of them could make it. However, the child does much more than gesture. In the scenes that he imagines, he not only thinks out what might take place, but he goes through the actions themselves, and thus he makes use of two means for expression of ideas. Now, we all know that a thought is very often not clear to adults until it has been expressed in words. Likewise, even though it has been expressed in words it is not so clear as it becomes when acted out. Hence the striking physical activity during the first years of a child's life is intimately related to his intellectual growth. It is one of the means by which he educates himself so rapidly during this period.

Suppose that when he is six years of age he enters school, what conception should be entertained of his work there? Is it to be his occupation to sit still and think? Or at best, does learning for him consist in thinking, in free exercise of the muscles of the tongue, and of those of the hand and arm in writing and figuring? If an abundance of physical activity was characteristic of those years when he learned so much, and if it was a necessary means to that end, why should not provision be made for it in the school work? Why should not the method of teaching, throughout the grades, at least, provide for plenty of physical movement, whose immediate purpose shall be to contribute to vivid imaging and to mental growth? The conclusion seems evident.

But how can this arrangement be effected? In the first place, one can plan to employ the hand in many kinds of subjects. For instance, if drawing is begun with school life, children can learn to express their thoughts as freely with chalk as with words; they will illustrate Hiawatha's fight with the sturgeon, or the interior of a coal mine, without the slightest hesitation. They not only can be made willing to step to the board when asked, but if they happen to be near the board they will step to it unconsciously when words seem to be inadequate to express the idea. This result, too, can be brought about not by skilled instruction in technical drawing, but merely by daily practice from the beginning in expressing all kinds of thoughts with chalk as well as with words.

Schools are already somewhat numerous in which this kind of work is done, and their number can be

greatly increased. The hands can be further employed in shaping clay to represent such objects as an Esquimo hut, or in using sand in geography work, or in painting a beautiful sunset, or in making objects out of paper, or pasteboard or wood. The thoughts represented by such objects can, of course, be expressed in words, but if in addition to that they can be told through the work of the hand, clearer perceptions can be obtained. In the second place it is often just as easy to employ the whole body as the hand in this expressive action. For instance, it is well in geography for a pupil, instead of saying simply that London is northeast of New York, to point toward it, or better still, to get up and walk toward it. It would be in place occasionally to have a walking exercise in the geography with such questions as the following: Let us now suppose ourselves in Paris, will you walk toward London? Walk toward St. Louis. Toward Rome. Again, we are now in St. Petersburg, will you walk toward Buffalo? Toward London, etc.? The entire class may be asked to face St. Louis, to face Duluth, Cincinnati, etc. During this exercise there is no need of talking whatever on the part of the pupils, they can answer the questions by their physical actions. Thus a pleasant variety is brought into the work, and it is a more thorough way of answering the questions put than the ordinary way. The author has found it to be the case very often that both children and teachers who know the directions in their locality and who can tell the direction that Philadelphia is from their home, will hesitate con-

siderably before they will stand up and walk toward Philadelphia. Without doubt this is due partly to the novelty of the request, but it is also due to the fact that a fuller realization of the direction is required in order to walk toward a point, and many people are not accustomed to mental imaging vivid enough to meet the demand immediately.

In primary reading there is no reason why a child should always show that he comprehends a thought by expressing it in words. If he has just read the sentence, "The door was opened," he can himself quietly perform that action; many good teachers adopt this device. In several studies it is possible to act out scenes in some detail. This is especially true of literature and history. In studying the life of Columbus, young people can represent how Columbus appeared before Queen Isabella, and reproduce the debate between him and the wise men of Spain. It is plainly an additional requirement beyond recalling the narrative from memory to ask them to represent Columbus and the wise men and carry on the supposed conversation in class, but it is done in some schools, and where it is done properly, vivid picturing is secured. The author is acquainted with a third grade that had an interesting experience of this kind in the story of Robinson Crusoe. When the point was reached in the narrative where Robinson was to teach Friday the English language, Margaret was asked to represent Robinson, and Richard, Friday. They stepped out before the class, and after a moment's hesitation, Margaret began beating herself on the breast and

shouting to Friday, "I, I am Robinson, Robinson," then she pointed to Friday and said, "You, Friday; you, Friday." This was done several times, but Friday understood his *role* sufficiently well to grin discouragingly and make a grunting noise. Margaret then saw that her plan was not succeeding and concluded to try another. Casting her eyes about her, she spied the sand table near by, and seizing Friday by the hand she hurried him over to it, plunged her hand into the sand and shouted, "Sand, sand," making motions. She forced him also to take some sand into his hand, and speaking the word herself, she required him to make the same sound. He attempted it and succeeded fairly well. From that time on Friday seemed to get the idea, progress was more rapid, and in a few more minutes several words were taught.

In literature and history it is very often possible to find a portion of a narrative which can be nicely illustrated in this way. Of course there is a very unnecessary loss of time if much care is taken to give regular drill in presenting a given scene. What is required is simply impromptu work, impromptu representation of any scene; nothing more is necessary.

One proof that such teaching as this secures more vivid pictures than otherwise is obtained in the fact that children who are taught in this way are quite likely to be made less self-conscious than they usually are; that is, they must so fully enter into the spirit of situations that they learn to forget themselves. This is a matter worthy of careful consideration on the part of teachers. Further than that, by acting out thoughts children really get posses-

sion of knowledge more fully. If instead of ending with words in regard to a topic, they close with actions, they feel that the ideas are more fully their possession, which means that they feel self-confidence in regard to their knowledge. The presence of such self-confidence is itself another proof that the picturing is vivid, for this confidence is lacking where situations are not clearly imaged. It is, therefore, an important test of method to inquire to what extent the teacher provides for physical action as a means of producing vivid impressions.

There are, then, four prominent factors to be attended to when vivid picturing is desired; past related experiences are to be appealed to in abundance; the things studied are, just as far as possible, to be seen and handled; a large number of carefully selected details are to be offered, and provision is to be made for physical expression of thought. By careful attention to these factors it is possible to present facts in such a manner that the pupil enters into their spirit so as to seem to experience them himself; he then feels himself among, or in the midst of them; or, in other words, is interested (*inter esse*, to be among or between or in the midst of).

The many precautions taken by skillful instructors are aiming always at this result, the exciting of deep, permanent interest. As a rule this aim is not attained, for usually there is a chasm, often a very wide one, between the child and his studies. He does not approach so closely to his geography, history, grammar, etc., that he is actually living the experiences there presented; on the contrary these

are spheres of thought far distant from his voluntary rambles; he may enter them at times under the sense of duty or under compulsion, but he recrosses the gulf to his own world the moment his freedom is given him. So long as this is the case, instruction is comparatively ineffective. The child is not himself, cannot be true to himself, and cannot grow in the true way, so long as he is not in his own world, in the world that he loves. The recognition of this fact during recent years has given a wonderful impetus to the investigation of method as well as to other problems in teaching.

The teacher's practice in regard to reviews is one very valuable test of his skill. It was a favorite maxim of the Jesuits that, "Repetition is the mother of studies," and the extent to which they applied it is astonishing. Every lesson began with a review of the preceding lesson, and ended with the review of that which was just covered. Besides this, one day a week was devoted entirely to repetition. In the three lowest grades, also, the second half of each year was spent in reviewing what had been taught during the first half. Probably modern educators would agree with them in the importance that they attached to review; at least it should certainly occupy much time throughout this second step. But modern educators would disagree with them radically as to the way in which it should be conducted. To-day repetition and review are by no means fully synonymous terms. On some occasions mere repetition, or reproduction of thoughts substantially in the way in which they were first taught,

is entirely in place. For instance, the one, two, or three summaries that have been suggested as desirable in each recitation may practically amount to a repetition of the facts presented.

Such repetition may also be in place at the beginning of a recitation when a work is called for that was accomplished on the previous day. It is advisable in this way to recall subject-matter for a few times in much the same manner in which it was originally taught; that is, practically the same questions and the same answers may be repeated until facts become well fixed for the first time. But before knowledge is really digested it is necessary to fix it in mind a great many times. Mere repetition cannot do this in the right way; what is needed is a new adjustment of a thought to our usual way of thinking, then another and another, etc., until it becomes welded to our personality on many sides. Repetition usually signifies verbatim reproduction; or, if not that, something so closely akin to it that mainly the memory, and not the reason, is appealed to. It requires that the same route be followed that was originally traveled, and hence always approaches knowledge from the same side. This is what the Jesuits did, and it is largely what was done in the term reviews so common in this country only a few years ago. It was the custom then to set aside the last two or three weeks of the term for a review of all the matter that had been taught during the term. This was the practice not only in the common schools, but in the normals and colleges as well. On such occasions so much was assigned for each lesson that there was no

hope of studying it so thoroughly as the first time it was covered. Indeed, that was not the object; the aim was rather to take a rapid view of all the ground traversed in the belief that one more look, though not a careful one, would greatly aid in fixing the facts permanently in mind. It was mainly a hurried repetition. But what stultifying work! Two, three weeks consumed at the close of each term without pretense of reaching new thoughts, or of reviewing old ones in a new light, but with the sole object of impressing the memory! There was certainly no inspiration to the pupil in that kind of work, or to the teacher, either. But, aside from that, there was little profit for the pains; the aim was a narrow one, and it was very poorly attained. When a review degenerates into a mere drill by repeating knowledge in the same form in which it was first acquired, it makes little impression upon the memory itself, and the hammering must be kept up a great while before it will tell. It was a narrow aim, too, because even after one has learned a thing so well that he can say it in his sleep, he has no proof that he knows it so *thoroughly* that he will be conscious that he has it when it is needed.

The world is full of people who need to be told when to use their knowledge, even though they have learned it by heart.

Reviews should aim to be much more than mere drills for the memory. They should aim to put the child into the possession of facts for use by causing him to approach them from as many sides as possible. No one who has thought of a point in only one way has real control of it; if he has repeated it a

great many times he has perhaps fallen into a rut rather than gotten a broad understanding of it. The world does not necessarily, in fact does not usually, adopt the one approach to a thought that was taught in school; hence, the school should prepare for the world by leading the pupil to one point from many directions.

Repetition is then, only one kind of review, and an exceedingly narrow one at that. Reviews in the main should mean a new view of an old thought, or a view from a new position. This kind has already been partly provided for by the preceding step, for, in the acquisition of individual notions, it was shown to be important to collect the past related experiences. Such a review can be further secured in the presentation of the new material, provided teachers can find sufficient energy to throw away questions that have become somewhat worn from use, and think new ones. Any important topic, when once taught, should be recalled many and many times, and the questions referring to it should be stated in all possible forms so that it can be seen from one side, then another, and another, etc. A mountain does not appear the same on one side as on another, and he who has observed it closely from one point may fail entirely to recognize it when viewed from a different position. The same is true of objects of knowledge in all subjects; it often happens that a mere change of the wording of the question utterly confuses an intelligent class.

The author was once acquainted with a senior class in a state university who, in their study of

pedagogy, had reached the conclusion that the development of good character was the chief purpose of the public school. The matter had been discussed at length until they seemed clear in their conception of good character and well grounded in their reasons for giving it such prominence. One day shortly after this result had been reached, the statement was made to them, "The superintendent of schools of one of our largest cities recently remarked that the chief object of the first three years of school is to teach children to read. Would you agree with him or not?" The reply came unanimously that they would. The matter was then carefully discussed and they saw that in this case the acquisition of knowledge was set up as the highest purpose of the primary grades while they had asserted that it should be the development of character. They acknowledged their inconsistency and withdrew their assent to the superintendent's remark.

Again soon afterwards they were tested on the same point, as follows: "A mother often says to her little child, 'Did you have your reading lesson to-day?' And if she is convinced that he did have it, she feels quite satisfied as to the success of the school so far as her child is concerned. Is she quite right?" The reply came that she was, in spite of previous conclusions to the contrary.*

*The author was recently discussing the relative value of studies with a class of twenty-five persons who averaged about ten years of experience in teaching. Nearly one entire recitation period was devoted to that topic. It was the custom of the class to receive a few questions, at the beginning of each hour, that bore upon any of the preceding work of the year. Accordingly the next day after the recitation mentioned the question put was, Have we at any time during this year discussed the problem, What knowledge is of most worth? The unanimous reply was that we had never considered it. In like manner children often "haven't yet had" a topic which has already been "had" and finished by them.

These are merely examples showing how, after a question has been settled not only *once* but even *several* times, a query somewhat different from those already presented will prove that it is not yet by any means really settled or brought into relation to other kinds of experience. It is largely because matters have been reviewed in only one way, from one point of view, that strangers, who have different ways of looking at things from the teacher, receive no replies, or very ridiculous ones, when examining school children. If there were usually an element of newness in the reviews, so that they might be distinguished from mere drills and repetitions by taxing the thinking power, they would prove more interesting and thereby make a deeper impression upon memory; they would also lead to greater thoroughness of knowledge and thus eliminate to a considerable degree such discouraging answers as the above.

There is no desire expressed here to diminish the amount of time devoted to reviews. The great danger is that they will receive altogether too little rather than too much attention. On the average probably from one-third to one-half of the time in school should be spent in considering topics that have already been studied. It occupies much time to recall the old related experiences in approaching a strange idea and in following the developing method; it consumes much more to compare facts studied, with the object of finding similarities and differences and essentials; it takes more still to review old knowledge by applying it until it becomes

one's own; when all this is done and when, in addition to it, time has been taken for proper repetition, and for review by numerous questions put from new points of view, one will find that easily one-half of the teaching time has been consumed. But the time for review should not come mainly toward the close of the term—it should be scattered all along the term, every recitation containing considerable of it. Only in that way can a student become so familiar with thoughts that he has his bearings in regard to them no matter from what side he may be approached.

One of the important parts of any recitation consists in the assignment of the lesson for the next day. In case the developing method is employed, the aim of the next period should be clearly stated in the latter part of the recitation, and when the next period arrives that aim should be recalled. In the meantime the pupils can be held for careful reflection on what was last accomplished so as to reproduce it correctly and with ease.

In case a text-book is used, sufficient time should be taken toward the close of each recitation to state the aim for the next period, and to allow at least the preparatory step, so that the class may approach the text at home in an apperceiving mood. It is important that this preparation be completed before the text itself be discussed.

But whatever method be employed, all that has been heretofore said about the importance of fixing a definite aim applies to the assignment of the next lesson. If a clearly defined object is a necessary

condition of valuable study in the presence of the teacher and with his help, it is all the more evident that when left to study at home by themselves children will lose much of their time unless guided by a clearly defined purpose in each lesson.

The time necessary for the second step varies indefinitely. Sometimes it may not occupy more than fifteen minutes. But when it is remembered that it deals with individual notions and must furnish as many of them as are necessary, as data, for reaching a generalization, often a broad one too, it is evident that it may occupy many recitation periods. Eight or ten recitations are usually required to teach the story of the Discontented Pine Tree. One of them is necessary for the first step, then five or six for the narrative itself or the second step, and the other three for the general truth and its application. It would take fully as much time for the Golden Touch in the third or fourth grade. Several individual trade-centers should be studied somewhat in detail before the generalization, trade-center, could be reached. Minneapolis as the first example, and a type, might require two weeks, although the others could be taught in much less time.

In order to realize that all sections of our country must be firmly united under one central government, very many data are necessary. A careful treatment of those given in Chapter II could easily occupy two months in the sixth grade.

The successful treatment of these concrete data makes a great demand upon the teacher. In order to excite deep interest among her children in her subject-

matter, she herself must be deeply interested in it. As she approaches the class she must feel that she has something valuable to give them, something that they will value highly as well as she. How little this is the case with many common topics, as person, voice, and case in grammar; the location of cities in geography; the teaching of the several cases in percentage, etc.! The first demand on the teacher is, then, that she know her subject thoroughly and feel its richness. But far beyond that, she must have prepared each lesson with much care before she can hope to provoke free, pointed discussion, of such quality that good summaries will be given in the natural language of the child.

This is the ideal, which can never be fully attained. But it can at least be approached; and there is the consolation, too, in case of failures, that constant, earnest practice will rapidly render a near approach to it more and more easy.

In this chapter a large number of factors have been considered that are important in the presentation of individual notions. The original question was, How should individual notions be acquired? In answer, the first prominent conclusion reached was that the past experiences related closely to a given topic should be called to mind in abundance; the method of doing that then received attention. After a foundation for the new concrete facts was thus laid, the new individual notions were to be presented; again the method of doing this received careful consideration. Owing to the length of the discussion there is possibly some danger of forget-

ting the simple question involved, *i. e.*, the presentation of individual notions, but the summary of it all is that there are two steps in the mastery of percepts, the step in which the mind is prepared for the new concrete matter, and the step in which the latter is presented. These will often be referred to in the future as the first and second formal steps of instruction.

CHAPTER VII.

How Proceed From Individual to General Notions?

INSTRUCTION often ceases at this point as though all was finished when individual notions have been acquired. This is the case in much of history and geography; that is, in these subjects there is often little more done than to collect a mass of facts about individual men, battles, and administrations, cities, mountains, and rivers, etc. But we have seen that percepts without concepts are blind, they give no insight into general truths and laws. Sense impressions, vivid concrete pictures or percepts are only the starting point in instruction; its end has not been reached until these concrete data have been sifted and fully interpreted. We have thus far, as it were, merely collected the material out of which to build some structure; just what kind it shall be is not yet determined; it now remains to look over the many things with care, to see what can best be made out of them. Or we have thus far only gotten together in piles the books which are to constitute our library; the usefulness of the same will now depend upon the care that is taken in sorting, arranging, and indexing them. Hence there is much work still to be done. It might happen that the accidental arrangement of the books itself would suggest their proper classification, or that the mere sight of building materials,

without any careful study and arrangement of them would hint at the best use to which they might be put. So in instruction it can happen that the concrete data immediately suggest the large truth that they are intended to teach. This is the case with the Golden Touch. The experiences of Midas, his repentance, etc., are not peculiar to the king alone. The child quickly feels that Midas is typical of many people, and that, if their selfish wishes were granted they, too, like him, would be grievously disappointed. Thus a glimpse is caught of the general truth, the universal application. But is it not important to catch more than a glimpse of such a weighty truth? Should not a full view of it be obtained by bringing together those facts within this narrative that point to it, and also by calling to mind other stories and any actual experiences of life that teach the same thought? Baucis and Philemon had their wish; did they choose more or less wisely than Midas? Why? In what respects was Solomon's choice a wise one? How did Midas overestimate the value of money? What use did Robinson Crusoe make of his bag of money when upon the island? Why? Such comparisons and questions bring the abstract thought into full view until it can be stated in words, and they do it in such a way as to establish a conviction.

Any student of United States history necessarily becomes acquainted with some of the sad results of our want of unity during the Revolutionary War and the years immediately following; but because the instruction is not planned to teach convincingly that our states must be united, no intelligent con-

viction in regard to that matter is established; some of the most valuable data are omitted entirely, and those that are furnished by the book and teacher are not so massed as to point inevitably to close union as the solution of the many difficulties.

Geography contains almost an overplus of concrete facts, but too often instruction stops with them, and the result is that only a vague conception is given of trade-center, manufacturing country, canal, harbor, mountain, beautiful view, etc. Beyond doubt the defect is due partly to the fact that individual trade-centers, harbors, mountains, etc,, are not studied in such detail as to furnish the accurate facts necessary for a fairly correct concept. Some idea of the number of details required for that purpose was given in connection with Minneapolis. But the defect is due also to the fact that such concrete data as are studied are not brought together and compared. Minneapolis and the other cities along the Mississippi river that were mentioned represent only one kind of trade center. Minneapolis is an excellent type of our large Western cities that deal largely in grain and lumber, and ship goods in and out by rail. But all centers of trade do not handle mainly these goods, nor depend so fully upon railways. Buffalo adds coal and live stock to the articles mentioned, and waterways by the Great Lakes and Erie canal. Pittsburg deals largely in iron products, London in wines, fruits, iron goods, etc. A glimpse of the characteristics necessary to a trade-center is furnished by a study of Minneapolis alone. But in this case, as in that of Midas, more than

a glimpse is wanted; and it can be gotten, as there, by comparing facts along the same line learned from other sources. In this case several great cities should be carefully compared in order to reach a clear conception of trade-center.

One can get only a dim conception of valley by observing only one valley. It is customary in good schools to examine a neighboring valley, estimating its length, breadth, etc. But it is usually so narrow that one can throw across, or at least see across it. It gives a very distant suggestion of the Mississippi Valley. Many a child who can define this word and illustrate what he means, is mystified by being assured that he himself lives in the Mississippi Valley, for he has never even seen that river. So the worded definition fails of interpretation until numerous valleys of various sizes and characteristics are studied and compared.

These instances show that it is unsafe to stop short of the abstract truths, the rules, laws, or definitions. When one has presented only the individual notions he has, as it were, what he knows to be valuable gold ore in his possession. But the latter must be refined before it can be brought into relation to human needs, before it can be used; so with knowledge; the non-essentials that are mixed with the essentials in concrete facts must be separated from these before the latter can become adapted to our use. That itself is a very important part of instruction. In arithmetic it is not left to a few examples worked to suggest of themselves the arithmetical rule; that would involve too much risk. It is a mat-

ter of vital importance to compare the steps taken in adding different groups of fractions in order to discover what must always be done, *i. e.*, what the rule is. This is the case, too, in all study. The first and second great steps of instruction give command at best of well-arranged series of individual facts; from these the general truths are still to be drawn; and unless this is done the instruction of the teacher is, as a rule, largely in vain. So far as knowledge is concerned, general truths are the teacher's harvest; just as the reaping and threshing of wheat are essential parts of wheat raising, so the careful reaching of generalizations is an essential part of good instruction.

While the acquisition of concrete facts may be regarded as a single large step, it was found to consist of two minor acts, each of which involved a large number of valuable considerations. So the progress from individual to general notions is not simple; enough has been said to indicate that the individuals must be compared in order to discover in what respects they are alike and what properties are essential to all; then must follow a collection of the essential characteristics of the class and an expression of the same in words in the form of a definition, maxim, or proverb, etc. Hence, there may be said to be two stages in proceeding from individual to general notions, one the stage of comparison and abstraction, the other of definition; the former would then be the third, the latter the fourth step in the mastery of general notions, since, as shown above, two are necessary in acquiring the concrete data.

Third Step.

Comparison presupposes a knowledge of things to be compared; one can not well hunt out resemblances and differences among objects before these themselves have been separately studied. The argument for this statement is well worth thinking out, it would require too much space to be presented here. The opposite practice is quite common. The extent to which the comparison is carried must depend upon the number and nature of the data furnished through the second step, or through other similar experiences acquired either in or outside of school.

Few problems involving addition of fractions need be solved before their comparison can take place with the view of reaching the rule. This is because one problem is quickly recognizable as typical of all others. Likewise the metamorphosis of one insect readily represents that of others of the same class. The moral of a story may easily be reached from the one narrative when the theme is simple and when it recalls numerous past experiences tending in the same direction. This is the case with the Golden Touch. Children who are quickly susceptible to the force of the underlying truth must necessarily have been led already to reflect on the occasional uselessness of gold; for instance they have found Crusoe rightly preferring a jack-knife to a whole bag full of money. And such experiences, coupled with the narrative, indeed compared with it unconsciously, cause the moral to seem easy and capable of being reached at a single bound. However, as already

shown, it is reached much more effectively if time is taken to recall other related experiences and compare them all.

But some of our great classics furnish remarkable examples of a common inability to "read between the lines." Pestalozzi's Leonard and Gertrude was undoubtedly regarded only as an interesting story, not as a work on education, by the great majority of its multitude of admirers during the previous century. Even to-day students need to be cautioned that it is educational in its aim before they are inclined to discover in it educational truths. One hundred years ago people wanted many of the experiences that must be put alongside those of the novel in order to bring out clearly its fundamental thought. Now they have plenty of them, but easily fail to call them to mind and to associate them with the contents of the book. Hence it must be a part of the instructor's duty to call up such experiences and suggest, through them, the generalizations intended.

This book furnishes an excellent example of a properly realized second step; *i.e.*, there is an abundance of incidents or particulars so presented as to be very clearly seen and appear interesting; but while there is no fault to find with it in that respect, the reader must extricate himself from this mass of details and discover the great truths that the essential part of the story indicate before he has really read the book or gotten its worth.

In general, this step of comparison must be a considerable abridgment of what is necessary in a complete induction. It would be agreeable if a great

number of individual valleys, trade-centers, and stories teaching the same underlying thought as the Golden Touch, etc., could be studied in detail. But want of time, in school at least, forbids. Only a few well chosen types can there receive such close attention, and they must represent and explain in a rough way the entire class to which they belong. It is the duty of the home to supplement this work of the school.

If these individuals have been accurately and interestingly taught, the comparison that follows can awaken great life. It is interesting to note how a cat or a dog runs across the floor; but it is more interesting still to note how the former is fitted to do it so much more quietly than the latter. We enjoy observing just how the sheep, the cow, or the horse clips off grass from the meadow, but we enjoy still more the comparison of them to discover why one prefers long grass and another grass that is very short. Tennyson's poem of The Brook is very attractive in itself, but after seeing what message a little stream carries not only to one poet but to two or three, it is especially attractive to compare these messages and their various styles of expression. The old Greek heroes were wonderful men; so were our own pioneers. A class that has formed a close acquaintance with both sets of men is likely to become especially stirred in determining which had the greater difficulties to meet and which were the nobler.

Such comparisons increase not only the interest in knowledge, but its accuracy and definiteness as

well. One serious defect in most instruction is that the facts taught are abandoned too soon for the sake of new ones, and in consequence they are neither thoroughly comprehended nor even retained in memory. But the moment we begin to compare animals or poems or men, etc., they must be recalled vividly to mind; thus a careful review is instituted. But more than that: this knowledge is not reproduced in just the same way in which it was originally acquired; it is approached from some new point of view, it is seen in one or more new relations. We may be well acquainted with the life of Washington or of Lincoln, but if we were asked to show in what respects they were alike or in what respects one was superior to the other, we would have a good deal of thoughtful study, of hard thinking before us. Each life would need to be reviewed from a new position; points that we have been in the habit of emphasizing might receive little attention, while others that have been neglected might be brought into prominence; the result would be that new thoughts and perhaps new convictions would be reached. So a comparison of the Rhine, Hudson, and Mississippi valleys causes a careful review of each and adds new thoughts or facts to our stock. Most people are prone to recall facts, for instance the causes of the Revolutionary War, in the same order in which they were first learned, if they recall them at all; in consequence they make little advance in their knowledge, it does not grow more thorough. But comparisons tend to remedy the defect by forcing them to look at a subject from one side, then from

another and another, etc., the result is that their knowledge becomes more thorough, for seeing any topic from many sides or in many relations means thoroughness. Thus comparisons are an important agent in securing interesting reviews and wide comprehension of a subject.

The third step was spoken of not only as a step of comparison but also of abstraction. How the latter takes place may be seen from examples. In the study of trade-centers the individual characteristics of each were considered in detail. Without any further study of them we have a partially correct conception of the idea trade-center. But if we wish to make it at all accurate we must first compare these several great cities; one, Minneapolis, is the center for flour and lumber, another for coal, another for iron, fruits, grain, etc. Some depend mainly upon water for transportation, others upon railways, others upon both to a marked degree. Hence in order to be styled a trade-center it is unnecessary that a certain city deal largely in flour; neither must it be iron, nor coal; in fact it makes no difference just what the articles be, so we leave that matter out of consideration now. What do we hold in mind then? Those characteristics simply that are really essential and hence common to all trade-centers. In order to be properly called a trade-center there must be a large quantity of goods shipped to and from a certain city; also there must be conveniences for transportation—*i. e.*, plenty of railroads or waterways or other means for carrying. The attention is drawn away (abstracted) from all minor

and non-essential matters and centered finally upon those that are necessary for conceiving trade-center properly. In reaching a correct definition of valley one goes through exactly this same process of comparison and abstraction. It is practically the same in reaching the generalization in history in regard to unity. In that case while many details were studied showing the troubles that followed the Revolutionary War, only the more significant of these are now considered. They are brought together now and compared—perhaps ten or twelve important facts; most of these are found to be alike in pointing toward unity as their remedy; if some of them, though important, do not hint strongly at unity, the attention is withdrawn (abstracted) from them and centered on those that do. These latter being weighty matters and pointing all to the same conclusion are recognized as sufficient data on which to found the conviction that our states should be united.

People are continually reaching conclusions in this way, *i. e.*, through comparison and abstraction —so it is nothing strange. But the difficulty is that they do it very carelessly and hence make mistakes. They are the same in this case as in the observation of the common objects about them, *i. e.*, the results that they reach are hazy and inaccurate unless they expend conscious effort or do some real studying. It is the duty of teachers to give children training in this work and lead them to reach important generalizations correctly in all school studies.

Fourth Step.

After separating essentials from non-essentials it remains to collect the former and word clearly and accurately the result reached; for example, the necessary characteristics of a trade-center, the rule for addition of fractions, the law for the metamorphosis of insects, the underlying thought in the Golden Touch, or the generalization regarding unity, should receive definite statement. This is not an easy matter; the world is full of people who "know it but can't tell it." Some of the most common ideas are defined in words with the greatest difficulty. For instance, teachers quite frequently speak of good character as the purpose of education, yet they seldom dare attempt to state what the chief elements in such character are; all people are acquainted with Christ's parables of the sower, and of the wheat and the tares, yet it costs a struggle to word properly the thought in either of them. Everyone, no doubt, has often been surprised at his inability to express himself on a topic with which he had supposed himself to be familiar. What is the cause of the difficulty? Beyond question in most cases it is not first of all a lack of words, but of clearness of ideas; when one knows exactly what his thought is, he can usually give expression to it; hesitation is due to vagueness. It means a decided advance in thinking to state a conclusion tersely in words; it is an advance, too, that should be regularly required from all learners, for the final utility of the three preceding steps in instruction is directly

dependent on the clearness and accuracy with which generalizations are reached; their purpose is to lead to generals, and nothing is clinched until these latter are fully expressed.

In whose words should the abstraction be stated, in those of the child or student on the one hand; or in those of the book or teacher? Much is involved in the question. As a rule the mistake is made of hastening altogether too rapidly to reach the exact wording that the book or teacher prefers; as though an exact wording given to the child would necessarily produce an exact thought in his mind! The truth is that unless the exact notion has been approached very nearly by one's own power to think and use words, the definition carefully worded for him by another accomplishes nothing; it does not meet a feeling of need, and fails to be apperceived or appreciated. Any statement of a definition, law, or rule should be the immediate outcome of the thinking that has gone before, otherwise it is an imposition upon the child. To be sure, children can often reproduce the book's statement and talk about it with glibness, but that proves only their ability to handle words; they are often conscious that they are only playing with phrases and wondering if the teacher will find them out; this thing is happening every day in our schools, and as a rule the attempt to hide behind words is successful. It is a game of hide and seek between teacher and pupil—a masquerading with words.

If it is true that accurately worded statements from the book or instructor do not necessarily elicit

accurate thinking from the pupil, less faith should be placed in mere verbal accuracy, and the somewhat cruder statement from the child should be more willingly accepted. The latter is his own and is genuine. The exact definition very often does not and never will appeal to him, and, in that case, instead of being forced to learn it, he should be scolded if he allows himself, parrot-like, to repeat it. The boy who said that "number tells about the how-muchness of things," had the essence of the definition; why not judge him by that and preserve his individuality? It is one of the most difficult things in the world for one to be himself in the true sense, and school instruction, instead of discouraging the real expression of self in the use of words, should count that one of its high functions. Did not the boy have an accurate idea of a bat, who defined it thus: "He's a nasty little mouse with injy-rubber wings and shoestring tail, and bites like the devil?" Does the text-book come closer to the child's thought by describing it as a "Mammal with a wing membrane extending from the enormously elongated bones and fingers of the fore limb to the comparatively short hind limbs?" The adult's love of accuracy and graceful form of expression too often misleads him in these matters.

The uselessness of such a memorized definition is seen from the fact that, when once forgotten, there is no way of reproducing it except by turning to the book. Now the fact is that any rule or general truth taught to a child in school will *probably* be forgotten; that is discouraging, but it is certainly true; and as the text-books are not to be kept at hand

throughout life, how is the definition to be made available? The really useful generalization, the one that brings with it a feeling of strength, is the one that can be reproduced, after having been forgotten, through the data out of which it arose; it should be so closely associated with these and so directly an outgrowth from them that they can replace it when lost; the child himself should draw the generalization from the data in the first place, then when it is forgotten it should be reproduced by his own unaided effort. The first thing then in regard to the acquisition of definitions, principles, etc., is that the child reach them himself and state them as well as possible in his own words.

The ability to do this depends greatly, of course, upon his intimate acquaintance with the data themselves; the individual notions and their points of similarity must be well known to him; in other words the first, second, and third steps must have been properly covered; that is a presupposition.

But should he never accept the words of another? He may, and undoubtedly should, at times, but not until he has done his own thinking on the matter and feels the crudeness of his own wording. The mistake consists in offering the book's statement prematurely, before the need of it is present. If the definition for case in grammar, or the rule for the division of fractions, is taught before the thought itself stands out clearly in the mind, there is serious danger lest it may never be rightly comprehended; the reason is that the child, having once learned the definition or rule, refers to it for guidance and is

unwilling to turn back to speculate about its origin. It is very difficult, after having gotten the words for an abstract thought to go back and get the thought itself, for the mind is not then in a learning attitude; having secured the semblance of knowledge, it is deceived into thinking that it has the whole thing and is impatient of delay. The only safe method, then, is to move slowly towards any definition, taxing in full the learner's ability to think and express himself, until the correct conception is reached. After that, if there is difficulty merely about a brief and accurate wording, the form of statement given by the book or teacher is entirely in place and may be learned by heart.

Occasionally it is possible to clothe the principle in a classical garb; for example, the proverb, "How much better is it to get wisdom than gold!" expresses the ruling idea in the Golden Touch; "In unity is strength," the one suggested by the historical facts presented in chapter two. The Germans are far more accustomed to summing up their conclusions in this form than we, and the practice certainly adds grace and force to their speech. The reason for preferring a classical form of expression for a weighty thought over an ordinary form, is much the same as that for preferring a classical poem to a poem of mediocre worth. Hence school instruction should encourage familiarity with such proverbs or maxims as are found in Poor Richard's Almanac, the Bible, and Æsop's Fables, and should do so by selecting them to express valuable sentiments that have been taught.

Text-books are often in place in the fourth step. Many of them, as the ordinary small geography for beginners, brief outlines of United States history, grammars, etc., are little more than brief summaries of the main facts belonging to the studies that they represent. If these facts have been slowly reached, *i. e.*, to a fair degree inductively, they should be finally reviewed and accurately summarized. Such text-books accomplish this in an excellent manner. Among some teachers, especially in Germany, it is the custom to require pupils to enter their generalizations or main outlines of facts in small blank books, with proper headings; one book is kept for each study and, as soon as an important topic has been finished, it is written in its proper place. Thus the children practically make their own books.

Sometimes, especially with young children, it seems advisable not to teach the rule at all, relying upon the concrete facts—whatever their nature—to suggest it of themselves. This applies to Arithmetic and to Literature as well as to other studies. Froebel emphasizes it strongly in the kindergarten. Little people who cannot appreciate the statement of an abstract rule may remember how a typical example was worked and solve another in the same way; or in literature they may recall a story together with the feeling it produced, thus receiving some benefit from it, while a full statement of the moral might prove too abstract, or on other accounts, unwholesome. It requires much delicacy on the part of the teacher, especially when teaching morals, to distinguish what is best to be done in this regard.

Summing up: inability to state the generalization reached is due primarily to vagueness of thought; such a statement, then, is an essential part of instruction. The wording for the same should come from the child himself, being an immediate outgrowth from the data that he has at hand; this is especially important since any rule is likely to be forgotten, and unless it can be recalled without help, the utility of the knowledge is greatly diminished. The book's statement may be memorized, but not unless it seems to voice the child's own feeling. If possible a classical form of expression should be found for the generalization. If the precaution here advised in approaching the generalization is in place, it is apparent how ridiculous it is to place the general before children even before the individual facts have been presented, as is often done.

CHAPTER VIII.

How Should General Notions be Applied?

WHAT worth have these general truths which have been gained at such expense of labor on the part of both teachers and pupils? We may stop a moment to take account of our work done, and of the task that still lies before us. In the previous chapters we have dealt somewhat in detail with the series of steps necessary to the construction of those general notions which, properly fitted together, constitute the chief framework of a study. When the children have worked their way to a clear grasp of these general notions, by a self-active, inductive process of thinking, have they not reached the end sought by instruction? If so, the goal set up is a clear view of important principles. To those who look upon the school as a place of preparation, in contrast with later life as a field of application, this is the goal of school studies. But this leaves unsolved the child's most difficult problem, namely, the acquisition of skill in the ready use of principles. It has been said over and over again by the best teachers and writers on education that principles and rules are never safely mastered till they have settled into the usual practice and conduct of a child. "For from repeated cautions and rules, never so often inculcated, you are not to expect

anything either in this or any other case, further than practice has established them into habits." (Locke, par. 10, *Thoughts on Education.*) If children are to know how to apply important principles in later life, when shall they acquire the extremely difficult art of application? There may be a whole series of abortive efforts in education due to this disposition to call a halt in the mental movement before the final result in the form of useful application is reached.

The first of these errors was seen above in the verbal mastery of rules and principles without clear insight. No matter how fluently and trippingly a child in the school-room may run off such formulæ, the whole process of learning may be empty and farcical. At the other extreme, the most complete theoretical mastery of principles will not give proficiency in their practical use. One may master the grammar of the German language and still cut a most blundering figure in German conversation. Between the extremes of rote-learning and of clear insight into principles, there may be an entire series of miscarriages. But even beyond the step of clear insight, there may be the greatest miscarriage of all in the failure to turn clearly recognized rules into use. The end of instruction has not been reached until skill in the actual application has been developed. We deceive ourselves again and again by stopping at half-way stations on the highway of learning. We are not simply sightseers, to be satisfied with fine views and not caring to reach any destined point.

One who has worked his way up to the clear grasp of some important principle stands at a high point and gets a broad survey. A survey of what? Of the road he has already traveled, and in part also of that which he is still to traverse. That is, he has a double task to perform, first to look backward and see the extent to which the principle operates in what he already knows, and second, to look forward and apply it to the new problems which he is about to meet. Both these things are difficult. But they are difficulties which lie of necessity in the path of knowledge. As when travelers ascend some broad mountain range, till they reach at last the summit of the highest range, from which they look back over the slopes behind and forward on their journey through mountains and plains, so the student, as he rises to the grasp of some large principle, looks back over the steps already traversed and forward to those which follow. The discovery of a great principle is no doubt a long forward step, but it may take all the rest of one's life to find out the breadth and variety of its applications. The first grasp of such a principle, be it never so clear, is only a foretaste of the richer fruitage it will still bear. When Columbus first landed on the shores of the Bahamas, he had indeed solved a great problem, and had gone far toward establishing his general theory, but there was a bigger problem to be solved, both as to the continents of America and as to the extent of the world-whole. Since Darwin first expounded the law of evolution, it has been applied by scientists in scores of directions only vaguely contemplated by

Darwin himself. Macaulay, on the basis of the principles of common law in England, worked out a serviceable plan for the administration of justice in the courts of India. How the world is astonished from time to time by new applications of the power of electricity which operates under certain laws. Every new principle discovered becomes an instrument of investigation, a lever for prying open new secrets. General notions, the more we grow up to them, become more and more the interpreters of our problems, the keys, which, like the open sesame, unlock and swing open many long-closed doors. Nature everywhere locks the door and bars the intruder out. But whoever carries a bundle of bright keys in the form of principles and laws, and is constantly turning and testing them in use, will rapidly gain the freedom of the realm. This is indeed the goal toward which instruction should move, and never lag till the end is reached, namely, such a working mastery of general truths as shows itself in ready instinctive tact in common use. The great fact here to be kept in mind is, then, that the value of general truths lies in the freedom and versatility with which we can turn them into use.

We see now a great defect in much of our knowledge, and why it is so halting and unserviceable when called into sudden action under the emergencies of life. The old adage teaches that knowledge is power.

But the power of the school-trained man so often suffers a partial or complete paralysis in times of need that this old proverb seems only half true, or

in cases not true at all. Its truth depends upon the meaning which is read into the word knowledge. Undigested, unorganized knowledge is not power. Knowledge which has never been tested in use, never worked over into habit, is not power. Knowledge, stored away in the half-forgotten recesses of the mind and even in the time of learning not clearly understood, is not power.

The old question of the relation between theory and practice is here at issue. The prevailing question in school is, What do you know? But life insistently demands, What can you do? and since school prepares for life it should meet this demand. In the case of many reputedly well-educated people, there is a wide breach between their knowledge and their power to do. It is the duty of the school to make the ability to do a part of the knowing.

The boy who wishes to be a sailor has acquired some knowledge of ships and of seafaring life. He has heard stories and read books of voyage and adventure in foreign lands. In fancy he dreams of delightful voyages, and is only disenchanted by the rough usage of real sailor life. But this inuring to hardship and rough usage is a necessary preparation for good seamanship.

The errand-boy in the bank office forecasts his easy success as a great banker, but tires under the long routine and industry of working his way to a complete knowledge of the business. The young student of agriculture has vivid theories of the revolution needed in farming, but the careful and constant labor required for keeping down expenses and

losses, while securing profits, leads to wisdom and thrift.

But failure and miscarriages are not confined to young people. Older persons constantly blunder in measuring the distance and difficulty between an idea and its realization. In consequence life is strewn with wrecks. The unrealized schemes and half-executed projects of business men, everywhere cumber the ground. If the schools, therefore, can induce any habits which bring thought and action, knowing and doing, into vital union, they will perform a great service to society.

There are certain situations in life where such a close relation between theory and practice can be witnessed. The boy brought up by a prudent father to the hard and varied work of the farm, daily welds his thought and experience into union. His practice keeps pace with his knowledge. The young recruits of Prussia are inured, even in time of peace, to the hardships of war. The best preparation of a soldier is to experience the drills, marches, hardships, and maneuvres of army life. This kind of training makes the soldier a veteran before he has seen a battle. Our medical schools, by means of laboratories, dissections, and clinical operations come as near as possible to making expert physicians of their students before allowing them to practice. In trade and polytechnic schools, students are brought, by dealing with the actual materials and processes of their work, to skill and mastery of the mechanic arts. In all these cases the school is formed into the closest possible resemblance to

life. In law schools, by moot courts; in theological schools, by drill in preaching; in normal schools, by practice departments, there is a close approximation to the actual difficulties of later professional work.

But does this law of close and inseparable companionship between knowledge and its use prevail also in common-school studies? It is easy to see that professional schools, of all sorts, must lay great stress upon the use of knowledge, because each of them aims directly at practical efficiency in a single calling. But the common schools are not designed to fit children directly for particular callings. The knowledge they give fits equally for all callings. Now it will be acknowledged that the general culture acquired in the common schools is just as essential to complete living as is the particular knowledge gained in law, or dentistry, or engineering. But has it the same close relationship to practice? Why not? Mere knowledge is not what we are after in common schools any more than in a chemical laboratory, but rather character as expressed in conduct. Character is the union of theory with practice; it is the incorporation of knowledge into habit. If character is being formed in school years, just to that extent knowledge of some sort is being converted into use, changed into habit.

But the school is inclined to lose sight of this measure of its efficiency, to shift the responsibility for character and to set up an artificial standard of excellence. The present prevailing school standard is an intellectual grasp of knowledge, tested by ex-

aminations; unfortunately this test does not reach far enough. Oftentimes it falls far short of the final test of power to use. When a child in a history or reading lesson appreciates an example showing the bad effects of sudden and uncontrolled anger, he has caught a clear view of an important truth in life, but no one will claim that the lesson is really learned till he is prepared to curb his own anger under provoking circumstances. During the recitation, at recess, and upon the playground the teacher has better and more important opportunities for testing the best ideas in conduct than the written examination can furnish.

We all admit that the application of truth must come sooner or later, but when shall this be? Is it safe to postpone the use of knowledge to later years? Doubtless we shall have much need for it later on. But shall we be able to bring it into use in future years unless we habituate ourselves to its use during the period of acquisition? Children are in the full tide of life. They show many-sided activity. Conduct is not a future contingency but a present fact. They have all sorts of duties and responsibilities. There will never be a time when the child will have more varied uses for his knowledge than now. But the habit of separating knowledge from use is in itself pernicious and when formed in youth is a positive obstruction to success in mature life. Is it any less important that a child should put in practice day by day the merits and virtues of his early training than that a plumber, during his apprenticeship, should learn the technique of his work in iron. Is

it any more necessary that a theological student should learn to make and deliver sermons at the seminary than that a boy in school should learn to be self-reliant and honest in board work?

Many of the most important lessons of life must be learned and converted into habit long before professional studies are begun. Before the boy decides to be a merchant or a dentist, he must decide whether he will be an honest man or a rogue, a law-abiding citizen or a disturber, narrow and bigoted, or charitable and liberal. Until these things are settled and settled right it is an impertinence to talk of a profession.

The incomplete and theoretical character of much school knowledge is brought to light by the perfunctory and half hearted action of children while engaged in school work. Good study, like good eating, is marked by relish and appetite. But where zest is lacking, work is spiritless and without healthy tone. When the strong life impulses pour themselves through the school studies the latter then become a part of the child's deeper character-forming experience, that is, an organic part of life, not dead matter wedged in between the living tissues. Children should be occupied with studies which spring out of and return into their interests, which call out the full measure of their powers, the volitional, emotional, and active power, as well as the intellectual, all of which together give complete expression to their life impulses. A theoretical, bookish knowledge, to which our school work is sometimes limited, not only gives a torpid intellectual growth, but it dwarfs the

social activities. It is fractional and does not compass a child's whole life, nor reach far enough into his own deeply felt experience and need. It does not fill up the measure of a child's spontaneous action. And this many-sided spontaneous activity of children is their mode of applying knowledge to life.

If we neglect some of the normal phases of child-activity, as, for instance, the volitional and motor energies used in applying knowledge, why should we expect later life to make good the deficiency? How can a schooling which is not full enough to satisfy a child's present limited needs, prepare for the wider, more complex life that follows school? Adult life is an expansion of child life. If the boy is a theorist, seeking no useful outlet for knowledge, the man will probably show the same traits in an accentuated degree. If the child-life is incomplete and fractional, adult life will show the same defects. The only kind of knowledge that will stand the test of later years is that which has linked itself with conduct and has thus appeared in that final form by which its value is tested and its assimilation into life rendered complete. To make use of knowledge as it accumulates day by day is to rescue it from theoretical isolation, is to yoke it to service under the coercion of daily needs.

It is a praiseworthy economy of mental labor to sift out from studies that knowledge which is widely and constantly serviceable, and to mass the effort upon this as indispensable. For its supreme worth or worthlessness comes out only in use.

It is a mistake to collect a large body of principles and facts which have no present and only a possible future use—waste material, which is an annoyance in the learning and a burden to the memory. The simple principles of the English language come hourly into practice, and this is a test of their value as being worth learning. When this test is constantly made, education is stripped of waste and verbiage. We need to concentrate our efforts along a few important channels. Education, like the waters in the delta of the Mississippi, loses depth and carrying power as it spreads out into divergent channels. Captain Eads's plan of the jetties of the Mississippi river was to collect as much water as possible into a single narrow channel, and to scour out a serviceable passage across the bar. Likewise, the accumulation of thinking power upon those few principles in each study which have central importance and perpetual application is the true economy of mental effort. Studies which fall short of this useful goal cultivate theorizing and even do-nothing habits.

Both the faults as well as the merits in knowledge are brought out by use. In the effort to use acquired knowledge the partial or erroneous views come distinctly to light. Just as a piece of machinery when put into operation reveals at once any friction or imperfection of construction, so knowledge newly acquired is thoroughly tested in its application. In learning a modern language, like French, the daily and hourly effort to use the new rules brings out a multitude of blunders. but at the same time begets

constant improvement and mastery of the language. If newly gathered knowledge is not put to service, these difficulties do not appear, and we are led to a false security, a self-satisfied but empty presumption of knowledge.

On account of this varied stress upon the use of knowledge, can we be charged justly with lowering the standard of education, with forgetting higher things for the sake of direct utility? There is a lower form of utility which reduces everything to the standard of dollars and cents. This of course is to be rejected. The most important uses of knowledge and power can not be estimated in money, as for example the services of a parent or teacher or friend, and it is these higher uses of knowledge which it is the preëminent purpose of the school to cultivate. The great principle of utility is right and has universal value. The best thing that can be said of science or philosophy or religion is that it serves human needs. The doctrine of service is too vital and too deeply felt in our Christian civilization to need any defence. By their fruits ye shall know them. We have, in the service rendered, an infallible test of the value of the man. Knowledge is valuable just to the extent to which it can be transmuted into some form of useful service.

The application of general truths falls under the head of *Deduction.* The first four steps are inductive, leading up from particulars to generals; the last step is deductive. Does the deductive process expand and amplify our experience or does it simply give quickness and tact in use of what we have

learned? It is evident that the inductive process of deriving the general truth can touch only a few cases, *i. e.*, is narrow in its range. In treating Minneapolis as a trade-center and as a type of cities on the Upper Mississippi, a general truth about cities as centers of trade for collecting, manufacturing, and distributing products was evolved. But in applying this truth (deductive) to the lake cities we find the situation similar yet different. Albany and Troy, Bangor and Augusta, St. John and Montreal, furnish still further examples of trade-centers in lumber, but under quite changed circumstances. Pittsburg and Allegheny are fine illustrations of the notion, trade-center, in other products yet still more divergent from Minneapolis than those mentioned before. Should we compare Minneapolis with Liverpool, Glasgow, Hamburg, and Naples, we should find the same notion operative under widely differing surroundings and conditions. In other words, the continued application of the idea *trade-center* to new cities not only enlarges the number of objects falling within the scope of the idea but multiplies the variety of objects coming under its sway.

In the study of the milkweed butterfly the first inductive treatment of this topic is confined mainly to this one species, but in applying the general idea of *metamorphosis* to other butterflies we find great variety in size, color, food-plants, habitat, and organs. Extending this application to moths, another large and curious field of insect life is brought under tribute. Finally in referring the idea of metamorphosis to flies and other insects, we are astonished

at the simplicity of the law that pervades so great a variety of insect life. In the application of such a general principle or law we are constantly introduced to new and varied fields of knowledge, whose meaning is more quickly interpreted and more intensely felt because of its identification with what we have already learned.

Moreover, this constant variation and readjustment of the principle to new objects and conditions necessitates a genuine *thoughtfulness* at every step. It is not a mechanical routine which simply repeats the same action time and again. To apply general notions requires a rational self-activity. We never meet exactly the same situation a second time. The student in this case is like the pilot of a Mississippi steamboat. He must know not only the large bends and currents of the river, but also the shifting of sand bars, the new obstructions and snags, the changes that follow a freshet in cut-offs, and shiftings of the channel; in other words he must be alive to constant alterations and emergencies. Or as with the military strategist, in directing the movements of an army, every day brings a new situation, makes necessary a recombination of forces. Arithmetic illustrates the point perfectly. Every new problem is a new and somewhat modified application of the principle, and as the boy advances to more difficult miscellaneous problems he meets more complex and intricate embodiments of his principle. This fits him to meet the usual conditions and necessities of life. Every day brings a new situation requiring thoughtfulness in applying knowledge to new conditions.

In bringing up children in the same family we have a striking illustration of the necessity of modifying our application of principles to suit different individualities. A writer like Spencer can give a lucid statement of the universal truths upon which the management and proper training of children should be based. A father tries them upon one child in the family and they seem to work admirably. He begins upon the next child in the same way, but the method seems totally at fault. Is it really a weakness in the principles or in the clumsy method of applying them? He forgets to modify and adapt them to the new character. This adaptation of a principle to changed or more complex conditions is what makes the application of knowledge so difficult. It demands constant thoughtfulness and prudence. There are, indeed, kinds of business, fragments of trades in factories and shops which call for an invariable and exact routine; for instance, the carpenter who makes one invariable design, the operator who simply nails heels to shoes, or the switchman who pulls the levers of an interlocking switch. But these people do not develop strength and versatility of character; in fact they are in danger of becoming fixed in a narrow routine which unfits them for doing anything else when thrown out of employment.

From this standpoint of flexibility in the use of knowledge (as already discussed also in Chapter VI) we are able to estimate the value of a *review system* which simply repeats and drills upon the exact form of thought and expression which was first learned. There is, indeed, no objection to the exact formula-

tion of a general truth nor to memorizing it, but flexibility in its application is more important than verbal accuracy in its statement.

The stated reviews which drill and re-drill upon a form of words rather than upon a quick interpretation of a principle under changes and disguises is a cramping routine. It is much more important that a child shall get a quick, firm grasp of a general truth, in spite of its Proteus-like changes of form, than that he should be held to an invariable formula in its statement. Excessive routine-drills and repetitions give thought a certain cast-iron inflexibility. This fixedness makes knowledge unmalleable. It is like cold iron in the hands of a blacksmith. Our generalized thought needs to be made wonderfully pliant and flexible so as to shape itself to a thousand diversities of form. Some minds have a photographic accuracy in regard to principles and details, but mental photographing is not the higher form of thinking. Thought when rationalized in principles must be plastic and versatile.

The best form of review, therefore, is that which springs out of comparisons, which finds in the new lessons amplifications of old principles, which makes every lesson a review of old knowledge in the light of new experience. Incidental reviews and comparisons, by which every new topic is incorporated into the body of our previous experiences are the rational form of study. It is constantly making over, modifying, and expanding the old thought material. The stated periodical review presupposes a static condition in knowledge; such knowledge, when

finally salted down, partakes of the nature of a petrifaction and lacks that fluidity and pervasiveness which make it penetrate and permeate every nook and avenue of experience.

But principles lose none of their strength and stability by being rendered pliant and flexible. Their constant reappearance and identification among all the forms of experience reduce that experience to a certain simplicity and unity. Our principles have grown out of the elaboration of past thought and action, and they stand ready to measure up and test new data. Each person grows out of his own past into the future. The field for applying principles is our own present and new-entering experience, not some *terra incognita* to be revealed in adult life. Our own daily life and surroundings furnish the perpetual test of our maxims. The discovery of such pervading principles strengthens the personality and gives a center and foundation for the character to rest upon, from which it is not easily moved. It is when we fail to find an anchorage in such fixed yet flexible principles that we shift from day to day. This pliancy of knowledge can be secured largely in the natural order of studies.

Our examination of the school studies has given striking proofs of the necessity for the perpetual use of knowledge, following close upon the heels of acquisition. It is indeed a serious question whether it is *real* knowledge until it has been apprenticed to use in a variety of ways. When one or two arithmetical problems have been worked out to illustrate and fix a rule, it is not claimed that the

principle is fully understood. To insure more thoroughness in its mastery, problems of increasing difficulty are worked out and explained. Further on, miscellaneous problems, involving this rule in conjunction with others, are solved. All along, the quickness and versatility of the children are exercised upon mental problems involving the same rules. Even after all these devices and tests for insuring a clear recognition of the rule, under the various disguises in which it masquerades, teachers are often discouraged by the pupil's apparent blindness to the principle. The whole round of inductions and applications, if necessary, must be repeated. Among various difficulties, the hardest thing in the whole course of instruction is to learn to use knowledge *rationally*. Memory work is trivial compared with this kind of thinking power. This fatal weakness shows itself among college men, scholars, and among all classes of even so-called educated people.

The same difficulty is met in trying to get the mastery of good English. Language lessons emphasize certain correct forms and usages, *e. g.*, a drill upon the rule for irregular verbs or pronouns. The children see the old error, understand the principle, and apply it to a few sentences. But wrong language habits are not cured and remodeled by such brief exercises. In geography and science lessons, in reading and history, the children should run their language into these new and better molds. Else why have them? Or, if you like, let them disregard in history and geography the correct usage learned

in language. Let us encourage the children by our indifference and neglect to violate the principles which we have just been so anxious to inculcate (in another study). What is our teaching, then, other than a succession of contradictions? What greater inconsistency can we devise than to teach earnestly the value of a correct principle in one recitation, and then encourage children to ignore it in the practice of the next? What is worth learning in one lesson is worth practicing in all others where it naturally reappears. In reading we insist on a certain excellence and weed out the faults. It is equally important to require an expressive reading when reading is incident to grammar, arithmetic, or history. This will make good reading natural and habitual. Likewise, if a round, vertical script is required in writing lessons, let the same excellent penmanship appear in composition exercises, in arithmetic, in board work, briefly in all necessary written work.

In view of the principle of consistency just stated we conclude that any one study clearly emphasizes certain ideas and principles peculiar to that subject, till they stand out, in theory at least, with clearness. The other studies furnish just the necessary additional opportunity for *applying* these ideas and principles till they are converted into habit and become established in all regular usage. In pointing out this close connection we see how indispensable the branches of school instruction are to one another. No study can stand upon its own feet. Complete efficiency requires that all studies stand close to-

gether in mutual support. Complete isolation of different studies is extremely impractical because it destroys this opportunity for utilizing knowledge. If knowledge is not complete till it is worked over into regular practice, it is just as important to apply knowledge gained in one study to other studies as to get the theoretical mastery of each study within its own realm.

This unity and interdependence of different studies and experiences is still more vital in the important realm of moral education. Moral instruction, by itself, can effect little if anything. The moral ideas scattered through reading, history, and literature, no matter how beautiful and impressive they may be, need to reappear in all the studies, and especially in all the conduct incidental to the discipline and social order of the school. Perhaps the chief reason for the prevailing skepticism in regard to the value of moral instruction in schools is that it is too theoretical, too much divorced from practice. Efficient morality always finds an expression in conduct, in the application of moral principles to behavior. In this respect there is no study or phase of school life that does not need to be, in its entire inception and progress, moral.

So important is the practice of the virtues as compared with their theoretical treatment that many people have gone to the extreme of putting the whole emphasis upon the practice, and of giving no place for instructive examples and illustrations of moral ideas. As if conduct, the highest and most difficult of all arts, had no theoretical basis and no

rational approach, through instruction, to its difficulties and opportunities. The subject-matter of some of the school studies is prolific in moral and social ideas and examples, while all the studies, plays, recesses, and social experience of the school furnish a broad field of conduct and realization. Instruction and theory must culminate in use or fall far short of any practical result.

This entire discussion confirms us in the judgment that the application of general truths to a great variety of uses is the fifth essential step in all good instruction. The school in all departments of instruction should never limit itself to the theoretical treatment of studies, but the movement toward use and application should be strong and should constantly pervade all school effort. Anything short of this is not real education but is fractional or even abortive.

There are two important principles which not only demand, but constantly work out this translation of knowledge into power, into practical service; namely, correlation and apperception. The examples just given of the close interdependence of studies furnish one of the strongest arguments in favor of correlation. Apperception in every lesson emphasizes the turning of our accumulated store of knowledge into service. The very definition of apperception shows that new information can only be acquired and assimilated through the *interpretive use* of old ideas. Apperception throws a child back constantly upon his own resources; upon the thoughtful use of acquired knowledge and experience. It makes

no difference from what study or source the old knowledge springs. The geography lesson may draw its interpretive materials from reading, history, science, or the play ground. The whole horizon of experience should be kept in sight of every study. This is the true thoughtfulness and self-activity. It is simply a restatement in pedagogical terms of the old parable of the talents, that what we have inherited or accumulated is for use and not for hoarding.

The school then, like life itself, is as much a place for applying as for accumulating knowledge. The traditional idea of storing up knowledge against the evil day is narrowing and cramping in its influence upon child activity. The fact that children have quick memories and large receptive powers is not a safe ground for exclusive memory exercises. For children show such an overplus of activity in expressing and using their fund of knowledge that the argument in favor of application is at least equally strong. The avenues through which knowledge can be turned into use in childhood, and in school life itself, are so numerous as to constitute a full share of legitimate child life.

There is, therefore, a broad foundation upon which to base this demand for the full and complete expression of child life. Children are little men and women, and their impulses press on to a complete circuit of activity; perceiving, knowing, feeling, willing or doing. In this series, the productive and constructive use of knowledge is as conspicuous as any other phase of effort. The doing always rounds out and perfects the knowing. Without pressing on to

this final test of knowledge in use, the child's activity is prematurely arrested. On the other hand, education, by its excessively theoretical tendency, may produce a whole race of inefficient and impractical men and women.

In all the essentials of character and power such people are apt to be weak and worthless. They deceive themselves and others with the semblance of learning and education, but they are inexpert and bungling in important affairs. The *storage* theory of knowledge needs to be reënforced by the *present-use theory*, which organizes and unifies the incoming experience and gives it flexibility and aptness for still more important future service.

To teach children how to apply their knowledge requires much painstaking care and patience in the teacher. It is in their first efforts to apply knowledge that children are slow and bungling, and tax the long-suffering patience of teachers. Many a mother has made the fatal blunder of not letting her girls wash dishes or sew or make bread (even when they wanted to) because the girls were so awkward and blundering and unsuccessful in their first efforts. The mother prefers to do things herself rather than let the girls botch their work and waste materials. But the only road to success lies through this period of awkward and sometimes painful effort.

Even with our present methods of teaching, the amount of time spent in applying principles constitutes a large proportion of the available school time. In arithmetic three-fourths of all the time is spent in applying rules to problems. In reading, a still

larger proportion is spent in the effort to put in practice the few simple principles of oral expression.

The one chief purpose of language lessons is to cultivate the proper use of the correct forms of oral and written language. In grammar the parsing and interpretation of the rules of etymology and syntax, that is, application, take up a large share of the study. In writing and spelling we may say that the purpose for which they are studied is the necessity of their constant use in other branches. Drawing is now felt to be largely tributary (in the common school grades) to the other studies because of the service it can render in more clearly defining their objects and conceptions. In history and geography it would be more difficult to show the immediate uses of the knowledge acquired. This, however, is largely due to our faulty methods of memorizing facts, instead of studying out these facts in their important relations and uses. A general view of our school studies, as now taught, will show how fundamental is the principle of the application of knowledge.

But in order to secure the proper kind of thinking, self-activity, and organization of knowledge, still more time will have to be given to application. We are not wasting time when we stop and wait for children to think out the relations and use of what they are learning. We may, indeed, seem to move slowly but we are moving as fast as their thinking power will permit. It takes time for children to think out and adapt these principles to new and changed conditions. To neglect the cultivation of

such thinking power as this for the sake of a little verbal fluency and memory drill is shortsightedness and even folly.

In saying that the effort to apply knowledge is laborious, and that school study is thus rendered more rigorous and severe, we may seem to be laying an uncalled-for burden upon school children. But children will find in such applied study rich compensation for their effort. The truest satisfaction of all study comes from the conscious power to make ready use of it. Knowledge is always something of a burden and a discouragement till it has found an outlet in some definite form of utility. There is no point where we can stop in this movement toward knowledge and feel sure of its value, until the goal of useful application is reached. The real irksomeness and discouragement of study do not spring from proper efforts at application, but from the dull, often meaningless, memory drills, which do not even reach forward to clear knowledge, to say nothing of power to apply. Knowledge, which thus ends in a blind sack, and finds no entrance into the thoroughfares of life, is a deadening influence in our schools. It produces stagnation in voluntary effort, while successful application of newly gathered knowledge leads out into the clear sunlight of conscious power.

Children who have learned to apply one lesson thoroughly are ready and eager to grapple with new problems. There is no better test of successful progress in studies than this power to render practical account of our possessions, and there is no better guarantee for future energetic effort.

One conclusion that springs from this entire discussion is that *the proper use of knowledge has to be learned.* It does not come by accident or inadvertence, but is the result of definite purpose and rigorous effort. Even if later life with its severer tests were not to follow, the school would need the tonic of this kind of effort to adapt and use knowledge in order to bring school work to proper unity and completeness.

We may now glance back at the *lesson unit*, in the treatment of which application is the final step. In working up to a general truth or concept through particulars we have followed the inductive movement through the steps of preparation, presentation, comparison, and generalization. A single central thought which lies at the root of the lesson unity has dominated the entire movement. In the application we are still operating with this central truth, turning it about, testing it on new data, and detecting the various forms in which it clothes itself. The length of time, that is, the number of recitations required in working out this general truth through all the five steps, depends upon the simplicity or complexity of the central truth itself, and the amount of data required to develop and apply it.

CHAPTER IX.

LAWS UNDERLYING PROCESSES IN TEACHING.

IF THE leading thoughts thus far presented are true, there are certain steps in instruction that are universal. No matter what the study be, whether Latin, mathematics, science, or some other, there is a certain order that the mind must follow in acquiring knowledge. Through the old related experiences (first step, preparation) new individual notions are reached (second step, presentation); these are compared and their essential characteristics abstracted (third step, comparison), and the resulting general truth is worded (fourth step, generalization); this generalization finally receives application (fifth step, application). Since these steps are passed through in this invariable order without reference to the nature of the subject-matter presented, they are rightly called the Formal Steps of Instruction. They indicate the order of the movements of the mind, or of the forms through which thought must pass in reaching full maturity.

Now, law is reached the moment that a certain order is shown to be universal or uniform; for a law is nothing more than a statement of a uniform sequence, and a law of teaching, the statement of a uniform sequence in the process of learning. Hence, it

is clear that the Formal Steps of Instruction simply embody the laws of teaching.

I. The most prominent one, often known as the law of induction and discussed particularly in Chapter V, may be stated thus: the order of steps in the acquisition of knowledge is: (*a*) individual notions; (*b*) general notions; (*c*) application of general notions. Eminent authorities on teaching now generally agree upon this law, and it is stated by Huxley in these words:*

> The subject-matter of biological science is different from that of other sciences, but the methods of all are identical.
>
> And these methods are—
>
> 1. Observation of facts—including under this head that artificial observation which is called experiment.
>
> 2. That process of tying up similar facts into bundles ticketed and ready for use, which is called comparison and classification, the results of the process; the ticketed bundles, being named general propositions.
>
> 3. Deduction, which takes us from the general proposition to facts gained—teaches us, if I may so say, to anticipate from the ticket what is inside the bundle. And finally,
>
> 4. Verification, which is the process of ascertaining whether in point of fact our anticipation is a correct one.
>
> Such are the methods of all science whatsoever.

Considering 3 and 4 as belonging to step 5, the essential agreement of the preceding statements with this quotation is evident. It is well to ask what other method there is that could better be followed than this.

II. Another law discussed especially in the first part of Chapter VI is commonly known as the law of apperception, and may be stated in these words:

*Lay Sermons, p. 83.

New thoughts can be comprehended only by the help of old thoughts; also, new emotions (and volitions) are dependent both in quality and in strength upon old emotions (and volitions). The same general thought is expressed by Dr. W. T. Harris as follows:*

Inasmuch as instruction is the leading of the ignorant into knowledge by translating the unknown into the known, there are two factors involved: (*a*) The unknown subject; (*b*) The stock of knowledge already possessed by the pupil. The knowledge already possessed is the means by which the unknown can be grasped and retained. All learning is a translating of an unknown into a known, just as the learning of a foreign language proceeds by translating the unfamiliar words into familiar words, and thereby changing the strange into the familiar. This being so, unless constant reference is had by the teacher to the stock of familiar ideas belonging to the pupil, there is imminent danger to instruction. It may pass off into the process of exchanging unknown words for unknown words—a movement entirely within the realm of the unfamiliar. Such a process is not instruction, whatever else it may be.

III. The Law of Aim, discussed in Chapter VI, is one practically agreed upon in daily life, but until recently it has not been dignified by teachers as a law affecting their instruction. Nevertheless, they are coming rapidly to agree that a definite and attractive aim is a condition of the most effective work of any kind, and hence that a clear aim should be daily fixed in each recitation as elsewhere. Upon this point Dr. William Rein says:†

The pupil should know beforehand what is coming, if he is to bring all his powers to bear upon the work of learning; and it is easier to call out all his effort if he knows before-

*Rosenkranz, *Philosophy of Education*, p. 99.

†*Theorie und Praxis des Volksschulunterrichts. Das erste Schuljahr*, p 103.

hand what is to be gained. To conduct a child along an unknown road, toward an unknown object by means of questions and hints, the purpose of which he does not see, to lead him on imperceptibly to an unknown goal, has the disadvantage that it develops neither a spontaneous mental activity nor a clear insight into the subject. Having reached the end of such a line of thought, the pupil looks about himself bewil dered. He cannot survey the road which he has just gone over, he does not comprehend what has happened to him. He stands at the goal but does not see the relation that the result bears to the labor performed. He does not rise to that satisfactory mental activity and favorable disposition of mind which are stimulated by the pursuit of a clearly set purpose

IV. The law of self-activity has been insisted upon by all great educators in modern times, particularly, however, by Froebel. It may be briefly stated thus: Proper development is possible only through a high degree of self-activity. The law was discussed especially in reference to the development method of teaching in the latter part of Chapter VI. Herbert Spencer takes a very definite stand in regard to this matter, as is shown in the following quotation:*

In education the process of self-development should be encouraged to the fullest extent. Children should be led to make their own investigations and to draw their own inferences. They should be told as little as possible, and induced to discover as much as possible. Humanity has progressed solely by self-instruction, and that to achieve the best results each mind must progress somewhat after the same fashion, is continually proved by the marked success of self-made men

As indicated in connection with the discussion of the text-book method, there is abundant room for improvement in the application of this law.

*Herbert Spencer, Chapter II, in *Education*.

V. The law of absorption and reflection was briefly discussed in the latter part of Chapter VI. According to it, absorption in details and reflection in regard to them, regularly alternate in effective thinking. Herbart's own words are as follows:*

> Absorption and reflection, like a mental breathing, should continually alternate with each other. Absorption takes place when ideas are brought to consciousness one after another with proper clearness and accuracy; reflection takes place when they are collected and combined. The more fully and carefully these operations are provided for, the more effective proves the instruction.

Any good instructor unconsciously applies this law when he stops to summarize and take a bird's-eye view of ground covered, ranking the facts according to their relative worth.

VI. In Chapter VI the importance of physical action, or motor activity, was urged, and it was practically declared to be a law that ideas must find expression, must be realized in action, before they can be conceived with the greatest clearness and accuracy. The kindergarten, especially, has always stood for this thought; in its plan of study more time each day is devoted to carrying out ideas into action than to the presentation of the ideas themselves—a practice that has been by no means characteristic of instruction above the kindergarten. But in recent years several distinguished psychologists and educators have declared themselves in favor of accepting this statement as a law, and its marked influence on education in the near future seems certain.

*Herbart, *Paedagogische Schriften* I, p. 417.

VII–VIII. Other possible laws have been occasionally referred to in the preceding pages, but they are not here enumerated, either because of some doubt as to their universality, or because they are commonly thought of as affecting rather the selection and arrangement of subject-matter in studies than its method of presentation in the class-room. Two of these are known as the laws of interest and of correlation. According to the former a deep interest must be aroused in thoughts before they can exert the strongest influence upon mental life and character; according to the latter, the ultimate value of facts depends as well upon the number and closeness of relations into which they enter as upon the clearness and accuracy with which they are conceived.

The law of interest expresses one great condition of effective instruction; it makes a demand that the teaching accomplish a certain end, but does not itself give any hint as to how this end can be attained. It affects first of all the selection of subject-matter, but furnishes a daily test of method as well, by requiring that there be a healthy stimulation of the emotions as well as of the intellect in all instruction. The law of correlation was involved in the insistence (in Chapter VI) upon a close sequence in the facts of a lesson, in the demand that they be arranged in a series or network, and that even the teacher's questions reveal a close connection.

Both of these laws, therefore, have a direct influence upon method, although not limited to that field.

Undoubtedly there are other laws of teaching besides the eight that are here mentioned, but these are at least some of the broadest and most important. The law of apperception alone includes and interprets most of the so-called principles of teaching that have often been mentioned in times past; for example: from the near to the remote; from the simple to the complex; from the easy to the difficult; from the whole to the parts. These sayings are sometimes true, sometimes not. The law of apperception is deeper than they and shows where they are applicable.

These eight laws should be guides to the teacher in the fullest sense. It would scarcely be possible to conduct a single thirty-minute recitation without applying all of them several times, with the possible exception of the law of induction.

Thus we see a most intimate connection between theory and practice when skillful instruction is imparted. The fact that these are general laws and not specific devices prevents them from cramping the teacher's freedom and individuality, for a general law is always capable of infinite variety in application.

To the extent that laws of instruction are developed and brought into a system, there is a science of method; consequently these eight laws, being as deep and broad as they are and being intimately related to one another, furnish a fair basis for the assertion that there is a scientific method of teaching.

CHAPTER X.

SOCRATES' METHOD OF TEACHING.
(B. C. 469-399.)

SOCRATES lived at the time of the Sophists, a class of thinkers who taught that the test for truth is not man's reason, but his individual opinion, the view that he happens to entertain at any given moment. According to that theory two persons might make directly contradictory assertions on any subject and still both be right, just as they could disagree about the taste or smell of an object and both feel equally justified. That meant, in reality, that there was no general, no universal truth; there was nothing necessarily right or wrong, good or bad, to all persons alike, but whatever any one happened to think was as nearly right as the view of any one else. That doctrine made the individual man supreme, he was in the right no matter what position he might take.

It was the mission of Socrates to combat this theory and show that men entertained different views only because they thought imperfectly, superficially, one-sidedly, and did not see the full import of their thought;* that back of all their careless thinking was a common intelligence, or reason, which, if fully

*See Davidson, *Education of Greek People*, p. 108.

exercised, would reach the same conclusions for all, and thus force them to agree. His conversations with men were attempts to show them this fact, and to point out to them general truths that might have a marked influence upon their conduct. But the Sophists were by no means ready listeners or learners; probably a more hard-headed body of men never existed, for their very philosophy made them so self-conceited that they could scarcely be approached by an instructor; in what respect did they need a teacher, seeing that they were already well-informed, fluent speakers, and entirely in the right? If he succeeded at all in influencing them he must necessarily follow a pedagogical method; the following example shows some of the difficulties with which he had to contend, as well as the principles that he applied in overcoming them.*

I will show how Socrates addressed himself to such as thought that they had attained the highest degree of knowledge, and prided themselves on their ability. Hearing that Euthydemus, surnamed the Handsome, had collected many writings of the most celebrated poets and Sophists, and imagined that by that means he was outstripping his contemporaries in accomplishments, and * * * that, when he wished to do any business, he usually sat in a bridle-maker's shop near the Forum, he went himself to it, accompanied by some of his hearers; and as somebody asked, first of all, whether it was from his intercourse with some of the wise men, or from his own natural talents, that Themistocles attained such a pre-eminence above his fellow citizens, that the republic looked to him whenever it wanted the services of a man of ability, Socrates, wishing to excite the attention of Euthydemus, said that "it was absurd to believe that men could not become skilled in the lowest mechanical arts without com-

*See *Xenophon's Memorabilia.* Book IV, Chapter II.

petent instructors, and to imagine that ability to govern a state, the most important of all arts, might spring up in men by the unassisted efforts of nature."

On another occasion, when Euthydemus was one of the company, and Socrates saw him leaving it, from apprehension lest he should seem to admire him for his wisdom, he observed, "It is evident, my friends, from the studies that he pursues, that Euthydemus here, when he comes of age, and the government gives liberty of discussion on any point, will not refrain from offering his counsel; and I imagine that he has already framed an exordium for his public oration, taking precaution that he may not be thought to have learned anything from anybody; and it is pretty certain, therefore, that when he begins to speak, he will make his opening thus: 'I, O men of Athens, have never learned anything from any person, nor, though I heard of some that were skilled in speaking and acting, have I sought to converse with them; nor have I been anxious that any one of the learned should become my master; but I have done the exact contrary; for I have constantly avoided not only learning anything from any one, but even the appearance of learning anything; nevertheless I will offer you such advice as may occur to me without premeditation.' So it might be proper for a person to commence a speech who desired to obtain a medical appointment from the government: 'I, O men of Athens, have never learned the medical art from any one, nor have I been desirous that any physician should be my instructor; for I have constantly been on my guard, not only against learning anything of the art from any one, but even against appearing to have learned anything; nevertheless confer upon me this medical appointment; for I will endeavor to learn by making experiments upon you.'" At this mode of opening a speech all who were present burst out into laughter.

As Euthydemus had now evidently begun to attend to what Socrates was saying, but was cautious of speaking himself, as thinking by his silence to clothe himself with reputation for modesty, Socrates, wishing to cure him of that fancy, said, "It is indeed strange that those who desire to play on the lyre, or on the flute, or to ride, or to become ex-

pert in any such accomplishment, should endeavor to practice, as constantly as possible, that in which they desire to excel, and not by themselves merely, but with the aid of such as are considered eminent in these attainments, attempting and undergoing everything, so as to do nothing without their sanction, as supposing that they can by no other means attain reputation; but that of those who wish to become able to speak and act in affairs of government, some think that they will be suddenly qualified to achieve their object without preparation or study, and by their own unassisted efforts.

"Yet these pursuits are manifestly more difficult of attainment than those, inasmuch as of the very many who attempt them a much smaller number succeed in them; and it is evident, therefore, that those who pursue the one are required to submit to longer and more diligent study than those who pursue the other."

Socrates used at first to make such remarks while Euthydemus merely listened; but when he observed that he staid, while he conversed, with more willingness, and hearkened to him with more attention, he at last came to the bridle-maker's shop unattended. As Euthydemus sat down beside him, he said, "Tell me, Euthydemus, have you really, as I hear, collected many of the writings of men who are said to have been wise?" "I have indeed, Socrates," replied he, "and I am still collecting, intending to persevere till I get as many as I possibly can." "By Juno," rejoined Socrates, "I feel admiration for you, because you have not preferred acquiring treasures of silver and gold rather than of wisdom; for it is plain you consider that silver and gold are unable to make men better, but that the thoughts of wise men enrich their possessors with virtue." Euthydemus was delighted to hear this commendation, believing that he was thought by Socrates to have sought wisdom in the right course. Socrates, observing that he was gratified with the praise, said, "And in what particular art do you wish to become skilful, that you collect these writings?"

As Euthydemus continued silent, considering what reply he should make, Socrates again asked, "Do you wish to become a physician? for there are many writings of physi-

cians." "Not I, by Jupiter," replied Euthydemus. "Do you wish to become an architect, then? for a man of knowledge is needed in that art also." "No, indeed," answered he. "Do you wish to become a good geometrician, like Theodorus?" "Nor a geometrician either," said he. "Do you wish, then, to become an astronomer?" said Socrates. As Euthydemus said "No" to this, "Do you wish, then," added Socrates, "to become a rhapsodist, for they say that you are in possession of all the poems of Homer?" "No, indeed," said he, "for I know that the rhapsodists, though eminently knowing in all the poems of Homer, are, as men, extremely foolish." "You are perhaps desirous, then," proceeded Socrates, "of attaining that talent by which men become skilled in governing states, in managing households, able to command, and qualified to benefit other men as well as themselves." "I indeed greatly desire," said he, "Socrates, to acquire that talent." "By Jupiter," returned Socrates, "you aspire to a most honorable accomplishment, and a most exalted art, for it is the art of kings, and is called the royal art. But," added he, "have you ever considered whether it is possible for a man who is not just to be eminent in that art?" "I have certainly," replied he; "and it is not possible for a man to be even a good citizen without justice." "Have you yourself, then, made yourself master of that virtue?" "I think," said he, "Socrates, that I shall be found not less just than any other man." "Are there, then, works of just men, as there are works of artisans?" "There are, doubtless," replied he. "Then," said Socrates, "as artisans are able to show their works, would not just men be able also to tell their works?" "And why should not I," asked Euthydemus, "be able to tell the works of justice; as also, indeed, those of injustice; for we may see and hear of no small number of them every day?"

"Are you willing, then," said Socrates, "that we should make a *delta* on this side, and an *alpha* on that, and then that we should put whatever seems to us to be a work of justice under the *delta*, and whatever seems to be a work of injustice under the *alpha*?" "If you think that we need those letters," said Euthydemus, "make them." Socrates, having made the letters as he proposed, asked, "Does falsehood then exist

among mankind?" "It does, assuredly," replied he. "Under which head shall we place it?" "Under injustice, certainly." "Does deceit also exist?" "Unquestionably." "Under which head shall we place that?" "Evidently under injustice." "Does mischievousness exist?" "Undoubtedly." "And the enslaving of men?" "That, too, prevails." "And shall neither of these things be placed by us under justice, Euthydemus?" "It would be strange if they should be," said he. "But," said Socrates, "if a man being chosen to lead an army, should reduce to slavery an unjust and hostile people, should we say that he committed injustice?" "No, certainly," replied he. "Should we not rather say that he acted justly?" "Indisputably." "And, if in the course of the war with them he should practice deceit?" "That also would be just," said he. "And if he would steal and carry off their property, would he not do what was just?" "Certainly," said Euthydemus; but I thought at first that you asked these questions only with reference to our friends." "Then," said Socrates," all that we have placed under the head of injustice, we must also place under that of justice?" "It seems so," replied Euthydemus. "Do you agree, then," continued Socrates, "that, having so placed them, we should make a new distinction, that it is just to do such things with regard to enemies, but unjust to do them with regard to friends, and that toward his friends our general should be as guileless as possible?" "By all means," replied Euthydemus. "Well, then," said Socrates, "if a general, seeing his army dispirited, should tell them, inventing a falsehood, that auxiliaries were coming, and should, by that invention, check the despondency of his troops, under which head should we place such an act of deceit?" "It appears to me," said Euthydemus, "that we must place it under justice." "And if a father, when his son requires medicine, and refuses to take it, should deceive him, and give him the medicine as ordinary food, and, by adopting such deception, should restore him to health, under which head must we place such an act of deceit?" "It appears to me that we must put it under the same head." "And if a person, when his friend was in despondency, should, through fear that he might kill himself, steal or take away his sword, or any other weapon,

under which head must we place that act?" "That, assuredly, we must place under justice." "You say, then," said Socrates, "that not even toward our friends must we act on all occasions without deceit?" "We must not, indeed," said he, "for I retract what I said before, if I may be permitted to do so." "It is indeed much better that you should be permitted," said Socrates, "than that you should not place actions on the right side. But of those who deceive their friends in order to injure them (that we may not leave even this point unconsidered), which of the two is the more unjust, he who does so intentionally or he who does so involuntarily?" "Indeed, Socrates," said Euthydemus, "I no longer put confidence in the answers which I give; for all that I said before appears to me now to be quite different from what I then thought; however, let me venture to say that he who deceives intentionally is more unjust than he who deceives involuntarily."

* * * * * * * *

"Do you know any persons called slave-like?" "I do." "Whether for their knowledge or their ignorance?" "For their ignorance, certainly." "Is it, then, for their ignorance of working in brass that they receive this appellation?" "Not at all." "Is it for their ignorance in the art of building?" "Nor for that." "Or for their ignorance of shoemaking?" "Not on any of these accounts; for the contrary is the case, as most of those who know such trades are servile." "Is this, then, an appellation of those who are ignorant of what is honorable, and good, and just?" "It appears so to me." "It, therefore, becomes us to exert ourselves in every way to avoid being like slaves." "But, by the gods, Socrates," rejoined Euthydemus, "I firmly believed that I was pursuing that course of study by which I should, as I expected, be made fully acquainted with all that was proper to be known by a man striving after honor and virtue; but now, how dispirited must you think I feel, when I see that, with all my previous labor, I am not even able to answer about what I ought most of all to know, and am acquainted with no other course which I may pursue to become better!"

Socrates then said, "Tell me, Euthydemus, have you ever gone to Delphi?" "Yes, twice," replied he. "And did you ob-

serve what is written somewhere on the temple wall, KNOW THYSELF?" "I did." "And did you take no thought of that inscription, or did you attend to it, and try to examine yourself, to ascertain what sort of character you are?" "I did not indeed try, for I thought that I knew very well already, since I should hardly know anything else if I did not know myself." "But whether does he seem to you to know himself, who knows his own name merely, or he who * * * having ascertained with regard to himself how he is adapted for the service of mankind, knows his own abilities?" "It appears to me, I must confess, that he who does not know his own abilities, does not know himself." * * * "But as to the way in which we must begin to seek self-knowledge, I look to you for information, if you will kindly impart it to me." "Well, then," said Socrates, "you doubtless fully understand what sort of things are good, and what sort are evil." "Yes, by Jupiter," replied Euthydemus, "for if I did not understand such things, I should be in a worse condition than slaves are." "Come, then," said Socrates, "tell me what they are." "That is not difficult," said he, "for, in the first place, health I consider to be a good, and sickness an evil; and, in the next, looking to the causes of each of them, as drink, food, and employments, I esteem such as conduce to health to be good, and such as lead to sickness to be evil." "Consequently," said Socrates, "health and sickness themselves, when they are the causes of any good, will be good, and when they are the causes of any evil, will be evil." "But when," exclaimed Euthydemus, "can health be the cause of evil, and sickness of good?" "When, for example," said Socrates, "some portion of a community, from being in good health, take part in a disgraceful expedition by land, or a ruinous voyage by sea, or in any other such matters, which are sufficiently common, and lose their lives, while others, who are left behind from ill-health, are saved." "What you say is true," said Euthydemus, "but you see that some men share in successful enterprises from being in health, while others from being in sickness, are left out of them." "Whether then," said Socrates, "are those things which are sometimes beneficial, and sometimes injurious, goods, rather, or evils?" "Nothing, by Jupiter, is to be settled with regard to

them by considering thus. But as to wisdom, Socrates, it is indisputably a good thing; for what business will not one who is wise conduct better than one who is untaught?" "Have you not heard, then, of Dædalus," said Socrates, "how he was made prisoner by Minos and compelled to serve him as a slave?" "Such a story is told, indeed," said Euthydemus. "Have you not heard, too, of the sufferings of Palamedes? for everybody says that it was for his wisdom he was envied and put to death by Ulysses." "That, too, is said," replied Euthydemus. And how many other men do you think have been carried off to the king on account of their wisdom, and made slaves there?"

"But as to happiness, Socrates," said Euthydemus, "that at least appears to be an indisputable good." "Yes, Euthydemus," replied Socrates, "if we make it consist in things that are themselves indisputably good." "But what," said he, "among things constituting happiness can be a doubtful good?" "Nothing," answered Socrates, "unless we join with it beauty, or strength, or wealth, or glory, or any other such thing." "But we must assuredly join them with it," said Euthydemus; "for how can a person be happy without them?" "We shall then join with it, by Jupiter," said Socrates, "things from which many grievous calamities happen to mankind; for many, on account of their beauty, are ruined by those who are maddened with passion for their youthful attractions; many, through confidence in their strength, have entered upon undertakings too great for it, and involved themselves in no small disasters; many, in consequence of their wealth, have become enervated, been plotted against, and destroyed; and many, from the glory and power that they have acquired in their country, have suffered the greatest calamities." "Well, then," said Euthydemus, "if I do not say what is right when I praise happiness, I confess that I do not know what we ought to pray for to the gods."

"These points, however," proceeded Socrates, "you have perhaps not sufficiently considered, from too confident a belief that you were already well acquainted with them; but since you intend to be at the head of a democratic government, you doubtless know what a democracy is." "Assuredly,"

said he. "Do you think without knowing what the *Demos* is it is possible for a person to know what a democracy is?" "No, indeed." "And what do you conceive the *Demos* to be?" "I conceive it to be the poorer class of citizens." "Do you know, then, which are the poor?" "How can I help knowing?" "You know, then, which are the rich?" "Those who have not sufficient means to pay for the necessaries of life, I regard as poor; those who have more than sufficient, I consider rich." "Have you ever observed, then, that to some who have very small means, those means are not only sufficient, but that they even save from them, while, to many, very large fortunes are not sufficient?" "I have, indeed," said Euthydemus, "(for you very properly put me in mind of it,) since I have known some princes, who, from poverty, have been driven to commit injustice like the very poorest people." "Then," said Socrates, "if such be the case, we must rank such princes among the *Demos*, and those that have but little, we must rank, if they be good managers, among the rich?" "My own want of knowledge, indeed," said Ethydemus, "obliges me to admit even this; and I am considering whether it would not be best for me to be silent; for I seem to know absolutely nothing."

He went away accordingly in great dejection, holding himself in contempt, and thinking that he was in reality no better than a slave.

Of those who were thus addressed by Socrates, many came to him no more; and these he regarded as too dull to be improved. But Ethydemus, on the contrary, conceived that he could by no other means become an estimable character than by associating with Socrates as much as possible; and he in consequence never quitted him, unless some necessary business obliged him to do so. He also imitated many of his habits.

One is struck with the patience and caution exercised in securing the attention of Euthydemus, and in making him, at least to a fair degree, receptive before attempting any formal instruction; with this

end in view Socrates first makes a striking remark in the young man's presence, then he rebukes him forcibly, showing the ridiculousness of his conduct, and finally bestows upon him some merited praise. Experiences like these are repeated until Euthydemus becomes approachable. Socrates evidently recognizes that one must lend a willing ear before instruction can prove effective—here is the spirit of the first step; the learner is brought into the mood for receiving something.

Then Socrates sets out to teach him an entirely new and strange thought, *i. e.*, that he is positively ignorant about those matters with which he supposed himself to be most familiar. He attempts to define justice and fails; he discovers that he has not even thought about studying to know himself; he can not distinguish between good and evil; he becomes doubtful about the elements that constitute happiness; finally, he learns that, though ambitious to be a statesman, he can not tell what a democracy is, and he then concludes that it is advisable for him to hold his tongue, for he knows absolutely nothing.

Here we find practically an induction. It is introduced by remarks that pave the way for instruction (first step); then several facts are brought together showing surprising ignorance on the part of Euthydemus (second step); these are recognized as being alike in that they all point to one conclusion (third step); a conclusion that he himself finally words in a forcible manner (fourth step); from that time on Euthydemus shows a marked desire for instruction and accepts Socrates as his teacher (fifth step).

The method employed is conversational; Socrates tells exceedingly little outright, but, trusting to the past experiences and the native power of the human mind, calls forth by deft questions the answers desired.* These questions are too definite to allow any guessing or wandering of thought, and they follow in a wonderfully close sequence.

In this example we see most of the laws clearly illustrated that have been previously considered. But could one of us do the same thing? Certainly we can not hope to vie with Socrates. But with him the difficulty lay not so much in the method as in the subject-matter. In his day (and even at the present time) many of the subjects that he selected for discussion were not commonly understood. Consequently, as we read this dialogue we are impressed with the fact that we, if placed in the same situation, would not have had the slightest idea of the proper reply or query at each moment. Hence, it seems a very difficult method to follow. But if subject-matter is selected that we really comprehend—which is not impossible in the case of most of the studies that we teach in school—the situation is greatly simplified. The same method can then be employed and even seem easy. As previously stated, one of the important conditions of a proper application of the developing method is a fair comprehension of the subject taught.

*It is worthy of note that Herbart advocated the developing method and that Pestalozzi and Froebel scarcely thought of employing any other; thus the three educators in whom the "New Education" finds its source, who in fact control modern educational thought, favored the same method.

CHAPTER XI.

ILLUSTRATIVE LESSONS.

IN THIS chapter three lesson unities are worked out through the five formal steps, for the purpose of illustrating more definitely the inductive-deductive movement in the treatment of such important topics.

To work out such a lesson unity through all the essential steps may require several recitation periods. The lesson on irrigation will take probably four or five recitation periods of half an hour each.

THE IRRIGATION OF ARID LANDS.

First Step.—How can the dry lands of some of our far-Western states be watered from the rivers?

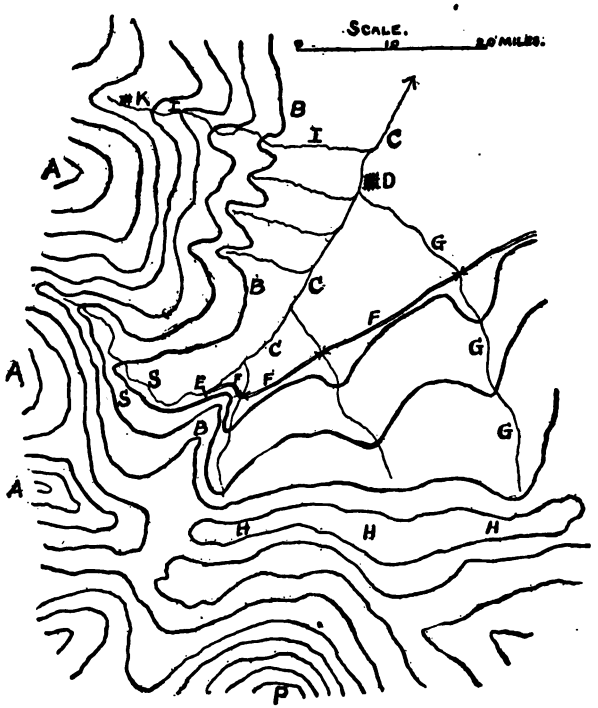
How are our farms and gardens in Illinois supplied with moisture? Do you know of any of our states where there is little or no rainfall on the plains? Point out on the map the dry region along the eastern base of the Rocky Mountains. What do you know from your geographies of the climate of this strip of country? What business may be carried on here? Grazing and mining. Have you heard of people who crossed the "plains?" Where are the plains? Recall Fremont's trip to the Rocky Moun-

tains. Can crops of grain or vegetables be raised on the plains? What are the difficulties? What rivers flow across this region and in which direction? Would it be possible to get the water from these rivers upon the dry uplands, so as to use them for purposes of agriculture? Tell what you may have heard of irrigating ditches.

Second Step.—The strip of country just east of the mountains in Colorado is very dry. There is almost constant sunshine, and very little rain, so that, though the soil is good, it bears only a thin, scattering buffalo-grass, and most of the year the country looks almost as barren as a desert. To explain fully the process of irrigating by ditches, "The Big Ditch," which is drawn from the South Fork of the Platte near Denver, is described as follows:

In order to show the position of this ditch and its relation to the river, the mountains, and the slopes, a map of the region about Denver is necessary, showing the South Fork of the Platte river, the mountains and foothills, and the slope on which the ditch is laid out.

The South Fork of the Platte river, after draining South Park, breaks through the foot-hills and descends to the northeast through the great plain lying east of the mountains. Southeast of the Platte a high watershed extends out from the mountains, separating the valley of the Platte from the valley of the Arkansas, still farther south. Pike's Peak, a prominent spur of the mountains, lies a little south of this watershed. From the foot-hills the country slopes eastward toward the Platte as indicated by



A. A. A.—Main chain of the Rocky Mountains.
B. B. B.—Foot hills.
C. C. C.—South Fork of the Platte.
D.—Denver.
E.—The dam.
F. F. F.—The ditch.
G. G. G.—Cherry creek.
H. H. H.—Watershed.
I. I.—Clear creek.
K.—Georgetown.
P.—Pike's Peak.
S. S.—South Park.

the small streams descending from the mountains. On the other side of the Platte the land slopes gradually from the height of land to the northwest, as indicated by Cherry creek and other streams, which, however, are dry most of the year.

This gently sloping land has a good soil, but on account of the dry weather has only a scant growth of buffalo-grass, useful for cattle-grazing. Denver lies at the junction of the Platte river and Cherry creek, and other cities like Georgetown and Black Hawk are located in the valleys of the mountains. The Platte river emerges from the mountains or foot-hills about twenty-one miles southwest of Denver.

Between the Platte river and the watershed on the southeast is a large area of gently sloping country, part of which it was proposed to bring under irrigation by means of a large ditch taken from the Platte river. Can you devise a plan by which the water from the river can be brought upon this plain? Where should the ditch begin, which way should it extend, and in what direction should the water flow through it? In order to get the water at a high level, so as to carry the water as high along the slope as possible, the engineers, following the stream into the mountains, constructed a dam in the river three miles above the point where it emerges from the foot-hills. The river itself descends rapidly as it rushes down through the cañon and out into the open plain. But the big ditch which is taken from the river at the dam is carried along the cañon in an artificially constructed channel with a slow current, so that, as it emerges from the mouth of the cañon,

the channel of the ditch is some twenty feet or more higher up than the current of the river. What special advantage (for irrigation) is it to have the level of the ditch twenty feet above the current in the river?

Near where the river emerges from the mountains a small stream comes into the Platte from the south and the Big Ditch is turned back along this valley, and, after crossing it, is kept as far back from the Platte river and as high up along the slope as possible. Why do they wish to keep the ditch as far away from the Platte as possible? As it extends to the northeast the distance from the Platte river gradually increases till at Denver it is eight or ten miles from the city, where it crosses Cherry creek.

After reaching the plain just east of the mountains, the Big Ditch was made by digging a channel in the earth, about forty feet wide and when the water was let in, about six or seven feet deep in the middle. In digging this great trench on which side of the channel would the dirt be thrown, and why? The digging required the labor of hundreds of men with teams and scrapers and other machines for removing dirt. The work lasted many months and cost many thousands of dollars. In some places the ditch resembles great railroad cuts through a hilly country.

When it was brought to one of the deep gullies or dry runs, which are frequent on the plains, it was necessary in some way to get it across. The largest and widest of these is the valley of Cherry creek, a half mile or more in width in many places. What can you suggest as a good plan for getting a large

ditch across one of these valleys? Sometimes a "flume" or aqueduct was built consisting of a great wooden trough, supported by heavy piles or posts, like a railroad bridge. This trough must be wide and deep enough to carry the full stream of water in the ditch. The seams and cracks between the boards were filled and calked up so as to permit as little leakage as possible.

The water with which the ditch is supplied comes from the river. But how does the river get its supply in such a dry country? It has been observed that there is a much greater rainfall and snowfall among the mountains and along the higher ridges than on the level plains to the east. The cold mountain sides condense the moisture into rain and snow. The mountain peaks and ranges have frequent rain and snow storms when no moisture falls upon the plains. The forests and vegetation upon the mountain slopes hold back the moisture also. In the spring when the warm sun melts the snows and in April and May when the spring rains come, the rivers are flooded. An immense amount of water, at this season, escapes down the river and is lost unless it can be stored up in reservoirs for use two or three months later, when it will be greatly needed. Where could such reservoirs be built? These reservoirs were constructed at various points along the Big Ditch by building dams across the valleys or along the edge of tracts of low-lying land. But in spite of these reservoirs the amount of water is sometimes insufficient to supply all the land during the spring and summer season of irrigation.

Many smaller ditches were built by the farmers or by small irrigation companies before the Big Ditch was constructed in 1881. Although lower down on the river, they have the prior claim, or water right, and it is only after they have been supplied that the Big Ditch (later built) can take the water from the river. Who settles such disputes? The legislature of the state, meeting at Denver, makes the laws regulating the division and use of the water supply among the different ditch companies.

How can the water be drawn off from the ditch and distributed to the farmers? When the Big Ditch has been liberally supplied with water, it is drawn off through wooden boxings or through gates to irrigate the separate fields. The boxing through which the water escapes from the main ditch passes under the embankment on the lower side. At the upper end it is below the level of water in the ditch. At the lower end is an upright slide or board which, being lifted, lets out the water, or by dropping it and throwing loose dirt about it in the boxing, the flow of water is stopped. Regular officers, or water inspectors, are employed to pass along the ditches and to regulate the amount of water sent out to the different farms, also to keep careful watch over the ditch-banks, reservoirs, flumes, etc. Sometimes in case of rains and freshets, the ditch threatens to fill up and break over its banks, wasting the water and injuring ditch and crops. In such cases how can the excess of water be turned off? Gates are opened at the flumes which allow the water to run off down the valleys. Usually a larger boxing lets out enough water to form

quite a good-sized ditch, from two to six feet across. This may skirt the edges of a number of farms and from it the water is turned off in small channels to the separate farms and fields. At what point should a ditch enter a farm? The fields are irrigated in different ways. A wheatfield or meadow is sometimes flooded; in a cornfield the water is often run down in small furrows between each two rows. When sufficient moisture is secured for a thorough wetting, the mouth of the ditch is closed up with a few shovels of dirt, and for a week or two the water is not turned on again. Most of the land slopes so regularly and evenly toward the river that it is possible to irrigate it fully.

How do the farmers measure and pay for water? The ditch company usually sells the water to the farmers by the inch, the amount of water passing through a hole an inch square being enough to irrigate an acre. The cost of an inch of water is sometimes from $1.50 to $2.50. The ditch company, having spent large sums of money in digging the ditch and in buying up the land, is justified in charging a rental for the use of the water.

The effect of bringing a district of apparently desert country under irrigation is very striking. Fields of grain, meadows of alfalfa and other grasses, cornfields, and vegetable gardens cover the country. Groves of shade trees and fruit orchards soon grow up, roads are laid out, fences, barns, and houses built, and the whole country takes on much of the appearance of a flourishing Illinois prairie in spring time. Wells are dug and are well supplied with

water, so thoroughly does the water saturate the whole soil. In the fall and winter the ditches are left dry. Land below the ditch (between the river and the ditch) becomes worth forty or fifty dollars to the acre, while just as good land above the level of the ditch, and only a few rods away, is worth but five or six dollars an acre for grazing purposes. It is claimed by the farmers that irrigation is a more reliable and satisfactory method of agriculture than farming in Iowa or Illinois where dependence must be placed upon the natural rainfall. What are the advantages of farming by irrigation? One farmer told me that in thirty-three years he had never had a failure of a crop upon a single field. The abundant sunshine can be counted upon to ripen grains and fruits.

The northwest slope of the Platte river (between the river and the foot hills) is supplied with water in a somewhat different way. Quite a number of small streams come down out of the mountains and foot hills and wind eastward across the slope to join the Platte. Between the mountains and the river at Denver, this rich level or rolling plain is about ten miles wide and is a garden of beauty and abundance. The small mountain streams moving eastward toward the Platte are dammed up at favorable points so as to form ponds or lakes. From one of these lakes the slopes lower down the valley of the little stream may be supplied with water by small ditches running out from the lake on either side. A stream may be dammed up in several places and thus constitute a series of irrigating lakes. From the foot-

hills a thousand feet above the plain one can count more than a score of these small lakes which preserve the abundance of the spring waters for the use of the farmers in the summer time.

On each side of the Platte river, therefore, there is a strip of well-irrigated land for many miles. What sort of market would you expect for the products of irrigation? The city of Denver with 130,000 people, furnishes a good market for much of this produce. Locate the chief mining towns within one hundred and fifty miles of Denver. An examination of the map of Colorado will show along the foot hills a series of mining towns such as Black Hawk, Boulder, Georgetown, Golden City, and Cañon City, while a few miles back on the plains are towns and cities like Greeley, Denver, Colorado Springs, and Pueblo, which make a large demand for vegetables, grain, grasses, and fruits. Unless they are raised by irrigation in Colorado, these necessary supplies will have to be shipped several hundred miles, from Kansas or Nebraska, or from Utah. A ready market at good prices is pretty certain to be found near at hand for all the products raised by irrigation.

In a brief review of the Big Ditch point out clearly its relation to the climate of Colorado, to the surface features and soil, to the rainfall, to cities and mining, to government and to commerce and population.

The first important river to the south of the Platte is the Arkansas which issues through the main ridge of the Rockies by way of the Grand Cañon not far from Cañon City. As it comes out

upon the eastern plains, its waters are drawn off in ditches to water the lower lands near the river. Even as far as western Kansas it is used for irrigation by means of ditches. In southern Colorado and west of the main chain of the Rockies, the Rio Grande, as it flows southward through San Louis Park, is drawn off in ditches to enrich this fruitful valley, and southward into New Mexico the waters of this river are used for irrigation. In northern Colorado and in southern Wyoming the North Fork of the Platte and its branches are used for irrigation, and large reservoirs or artificial lakes, many miles in length, have been constructed for the purpose of holding the spring floods in reserve.

Third Step.—Compare now these four rivers, the South Fork of the Platte, the North Fork of the Platte, the Arkansas and the Rio Grande, as related to the mountains and plains, as situated in reference to the mining cities and as illustrating facts of irrigation as now carried on. What is the relative importance of the small streams as compared with the large ones for purposes of irrigation?

Fourth Step.—In summing up the common features of these river valleys we may observe that they are all in an arid region, that they derive their water supply from the mountains; as they emerge into the plains at the foot of the mountains their waters are carried out to enrich the plains by means of artificial channels. The smaller tributary streams are used in a similar way. The presence of important mining cities near these river valleys and in them makes a ready market for all the products raised by irriga-

tion. The present wealth and population of these districts depend largely upon the irrigation ditches.

Fifth Step.—The school children, having seen clearly the conditions under which irrigation is possible and the means by which it is carried on, will be able to extend its application over a number of states and territories where similar conditions of climate, soil and surface features are repeated. By a study of the maps and the descriptive parts of their geographies they should be able to locate the arid regions and determine what rivers are useful for irrigation. Are the rivers of California irrigation streams? Of Utah? Of Washington and Montana? Finally locate the arid regions of the United States and compare them in size with the portions which have sufficient rainfall for purposes of agriculture. Could the rivers of your native state be used for purposes of irrigation if rain was lacking? For example, the Illinois, the Hudson, the Minnesota, the Tennessee? What have you heard of irrigating farms in Dakota and other states by means of artesian wells? Various attempts of this sort have been made. What are the difficulties likely to be?

In the later study of Africa, Asia, and South America we may interpret plans of irrigation in other lands and compare them with ours.

The Battle of King's Mountain and the Temper of the Common People During the Revolutionary War.

First Step.—We will see how the backwoodsmen of North Carolina, Tennessee, and Virginia prepared a surprise for Cornwallis and the British army. After the Battle of Camden, what was the condition of things in the Carolinas? Where was Gates' army? What was Cornwallis' plan? Will the people of the South attempt any further resistance to Cornwallis?

A survey of the situation at this time will lead the children to the conclusion that Cornwallis and the British were in high hopes after the Battle of Camden, and that the Americans were scattered and discouraged. Let the class study the maps and books, and get a clear view of this discouraging situation. Cornwallis seemed to be in full control of South Carolina, and by coöperating with troops sent to Virginia by Sir Henry Clinton, was planning to bring North Carolina and the whole South into complete subjection to the royal cause. We will see how the common people acted under these depressing conditions.

Second Step.—In the mountainous districts of western Carolina, in Tennessee and Virginia, were scattered settlements of backwoodsmen who had never submitted to the king. Cornwallis now sent Maj. Patrick Ferguson, with twelve hundred men, on a foraging march into the rough country of west-

ern North Carolina, with instructions to scour the mountain region between the Catawba and the Yadkin, harass the patriots, encourage the tories, and gather in royalist recruits. At Charlotte, in North Carolina, he was to rejoin Cornwallis' army. What sort of country had Ferguson to travel through? Would the backwoodsmen be likely to disturb him? What sort of training in fighting had they had?

As Ferguson marched into this wild region he found the people very unfriendly. Instead of selling their provisions to British soldiers, they distressed them by shooting down stragglers and messengers, and cutting off supplies from the British army. Neither Ferguson nor Cornwallis was expecting serious opposition from large bodies of American troops. Yet it was very difficult for the British to march through such a rugged and wild country. Besides, the Americans could sometimes bring together considerable companies of swift horsemen, who did great damage to detachments of the British army.

The story of the Battle of King's Mountain is thus told in Irving & Fiske's "Washington and His Country," pp. 423–427. Let the teacher tell the story, throwing in questions when needed:

"This hostility of the patriots was a sore annoyance to Cornwallis, depriving him of all intelligence concerning the movements of Ferguson, whose arrival he was anxiously awaiting. That doughty partisan officer was on his way to join Cornwallis when a chance for a signal exploit presented itself. An American force under Col. Elijah Clark, of Geor-

gia, was retreating to the mountain districts of North Carolina, after an unsuccessful attack upon the British post at Augusta. Ferguson resolved to cut off their retreat. Turning towards the mountains, he made his way through a rugged wilderness and took post at Gilbert-town, a small frontier village of log houses. He was encouraged to this step by the persuasion that there was no force in that part of the country able to look him in the face. He had no idea that the behavior of his followers had arrayed the very wilderness against him. (What sort of treatment had the patriots in the South received at the hands of the British?) The scattered inhabitants of the mountains assembled without noise or warning; a hardy race, half huntsmen, half herdsmen, inhabiting deep, narrow valleys and fertile slopes, adapted to grazing, watered by the coldest of springs and brightest of streams, and embosomed in mighty forest trees. Being subject to inroads and surprisals from the Indians, a tacit league existed among them for mutual defense, and it only needed, as in the present instance, an alarm to be circulated through their settlements by swift messengers to bring them at once to the point of danger. (Against what Indians had the early settlers of this region fought?) Now from the upland regions of Kentucky, Virginia, Tennessee, and the Carolinas, these bold backwoodsmen assembled to the number of three thousand, led by their militia colonels, Campbell, Shelby, Williams, Cleveland, McDowell, and Sevier.

"Threatened by a force so superior in numbers and fierce in hostility, Ferguson remembered the instruc-

tions of Cornwallis, and breaking up his quarters, he pushed for the British army, sending messengers ahead to apprise his lordship of the danger. Unfortunately for him, his missives were intercepted. (What might Cornwallis have done to help Ferguson?)

"Gilbert-town had not long been vacated by Ferguson and his troops when the motley host of mountaineers thronged in. The greater part were on horseback. Some were in homespun garb, but the most part in hunting shirts, occasionally decorated with colored fringe and tassels. Each man had his long rifle and hunting-knife, his wallet, or knapsack, and blanket, and either a buck's tail or sprig of evergreen in his hat. Here and there an officer appeared in the continental uniform of blue and buff, but most preferred the half-Indian hunting dress. There was neither tent nor equipage, neither baggage nor wagon, to encumber the movements of that extemporaneous host. Prompt warriors of the wilderness, with them it was 'Seize the weapon—spring into the saddle—and away!' In going into action, it was their practice to dismount and tie their horses, so as to have them at hand for use after battle, either to pursue a flying enemy or make their own escape by dint of hoof.

"There was a clamor of tongues for a time at Gilbert-town; groups on horseback and foot in every part, holding hasty council. Being told that Ferguson had retreated by the Cherokee road toward North Carolina, about nine hundred of the hardiest and best mounted set out in urgent pursuit, leaving

those who were on foot, or weakly mounted, to follow as fast as possible. Col. William Campbell, of Virginia, having come from the greatest distance, was allowed to have command of the whole party; but there was not much order or subordination. Each colonel led his own men in his own way. A rapid and irregular march was kept up all night in murky darkness and through a heavy rain. About daybreak they crossed Broad river, where an attack was apprehended. Not finding the enemy, they halted, lit their fires, made their morning's meal, and took a brief repose. By nine o'clock they were again on the march. The rainy night had been succeeded by a bright October morning, and all were in high spirits. Ferguson, they learned, had taken the road toward King's mountain, about twelve miles distant. When within three miles of it, their scouts brought in word that he had taken post on its summit. The officers now held a short consultation on horseback, and then proceeded. The position taken by Ferguson was a strong one. King's mountain rises out of a broken country, and is detached, on the north, from inferior heights by a deep valley, so as to resemble an insulated promontory about half a mile in length, with sloping sides excepting on the north. The mountain was covered for the most part with lofty forest trees, free from underwood, interspersed with boulders and masses of gray rock. The forest was sufficiently open to give free passage to horsemen. As the Americans drew nearer, they could occasionally, through openings of the woodland, descry the glittering of arms

along a level ridge, forming the crest of King's Mountain. This, Ferguson had made his stronghold, boasting that 'if all the rebels out of hell should attack him, they could not drive him from it.' (Why was this a strong position for Ferguson's army? How could the Americans best manage the attack?)

"Dismounting at a small stream which runs through a ravine, the Americans picketed their horses, or tied them to the branches of the trees, and gave them in charge of a small guard. They then formed themselves into three divisions of nearly equal size, and prepared to storm the heights on three sides. Campbell, seconded by Shelby, was to lead the center division; Sevier with McDowell, the right, and Cleveland and Williams, the left. The divisions were to scale the mountain as nearly as possible at the same time. The fighting directions were in frontier style. When once in action, every one must act for himself. The men were not to wait for the word of command, but to take good aim and fire as fast as possible. When they could no longer hold their ground, they were to get behind trees, or retreat a little, and return to the fight, but never to go quite off.

"Campbell allowed time for the flanking divisions to move to the right and left along the base of the mountain, and take their proper distances; he then pushed up in front with the center division. About four o'clock Campbell arrived within rifle distance of the crest of the mountain, whence a sheeted fire of musketry was opened upon him. He instantly deployed his men, posted them behind trees, and

returned the fire with deadly effect. Ferguson, exasperated at being thus hunted into this mountain fastness, had been chafing in his rocky lair and meditating a furious sally. He now rushed out with his regulars, made an impetuous charge with the bayonet, and dislodging his assailants from their coverts, began to drive them down the mountain. He had not proceeded far, when a flanking fire was opened by one of the other divisions; facing about and attacking this he was again successful, when a third fire was opened from another quarter. Thus, as fast as one division gave way before the bayonet, another came to its relief; while those who had given way rallied and returned to the charge. (Do you think Ferguson could have planned his part of the battle better?) The nature of the ground was more favorable to the rifle than the bayonet, and this was a kind of warfare in which the frontier men were at home. The elevated position of the enemy also was in favor of the Americans, as it secured them from the danger of their own cross-fire. Ferguson found that he was completely in the hunter's toils, beset on every side; but he stood bravely at bay, until the ground around him was strewed with the killed and wounded, picked off by the fatal rifle. His men were at length broken, and retreated in confusion along the ridge. He galloped from place to place endeavoring to rally them, when a rifle ball brought him to the ground, and his white horse was seen careering down the mountain without a rider. (Could Ferguson with his men have broken through the ranks of the Americans on one side and have escaped?)

"This closed the bloody fight; Ferguson's second in command, seeing all further resistance hopeless, hoisted a white flag, beat a parley, and surrendered at discretion. One hundred and fifty of the enemy had fallen, and as many been wounded; while of the Americans, but twenty were killed, though a considerable number were wounded. (Why, do you think, had the British suffered more in killed and wounded than the Americans?) Among those slain was Colonel James Williams, who had commanded the troops of Ninety-six, and proved himself one of the most daring of the partisan leaders.

"Eight hundred and ten men were taken prisoners, one hundred of whom were British regulars, the rest loyalists. The rancor awakened by civil war was shown in the treatment of some of the prisoners. A court-martial was held the day after the battle, and a number of Tory prisoners, who had been bitter in their hostility to the American cause, and flagitious in their persecution of their countrymen, were hanged. This was to revenge the death of American prisoners hanged at Camden and elsewhere. (Would you expect the backwoodsmen to follow up this victory by marching against Cornwallis?)

"The army of mountaineers and frontiersmen, thus fortuitously congregated, did not attempt to follow up their signal blow. They had no general scheme, no plan of campaign; it was the spontaneous rising of the sons of the soil, to revenge it on its invaders, and, having effected their purpose, they returned in triumph to their homes. They were little aware of the importance of their achievement.

"The Battle of King's Mountain, inconsiderable as it was in the numbers engaged, turned the tide of southern warfare. The destruction of Ferguson and his corps gave a complete check to the expedition of Cornwallis. He began to fear for the safety of South Carolina, liable to such sudden irruptions from the mountains; lest while he was facing to the north, these hordes of stark-riding warriors might throw themselves behind him, and produce a popular combustion in the province he had left. He resolved, therefore, to return with all speed to that province and provide for its security."

Third Step.—(The class is supposed to have had earlier in their history-study a complete account of Burgoyne's invasion, including the Battle of Bennington. Recall Burgoyne's invasion and the events which led up to the Battle of Bennington.)

The Battle of King's Mountain at the south suggests the earlier Battle of Bennington at the north. Under what circumstances did Burgoyne send Baum on the raid against Bennington? How did Baum prepare to meet the attack of the Americans? Burgoyne, after scattering St. Clair's army, followed up his victory with sending Baum on a foraging march toward Bennington. Compare this with Cornwallis after Camden.

Colonel John Stark and his Green Mountain boys assembled voluntarily at Bennington to repel invaders. Compare these with the backwoodsmen of Carolina and Tennessee who assembled under the six colonels at King's Mountain. The Tories and Indians at the north had exasperated the country

people by cruelties. How had the Tories and British treated the patriots at the south? Baum took a strong position on a hill and awaited the attack of the Americans. Ferguson at King's Mountain did likewise. Stark divided his army into three divisions and attacked on three sides at once. In both battles the militia attacked the British in a strong position and either killed or captured the whole body. The British leader was also killed or mortally wounded in each battle.

What was the result of each of these battles in its effects upon the movements of the principal armies? There were also certain points of difference worth noticing. At Bennington two battles were fought on the same day. At Bennington there were two leaders of the Americans, at King's Mountain, six, but they were not regularly appointed officers in either case.

Fourth Step.—As a result of this comparison we find a remarkable similarity even in the lesser details of these two battles, so far distant in place and time. Although they were small battles and insignificant in the number of troops engaged, yet they were very important in their influence upon two important campaigns. And what is also of much importance, they throw much light upon the spirit which the common people exhibited during the Revolutionary war.

At a time of great discouragement the people themselves, under their own neighborhood leaders, collect in large numbers, with such arms and equipments as they bring from their own homes, and

attack and capture veteran troops in strong positions. In this respect exactly the same spirit and energy of character are shown by the backwoodsmen of Tennessee, Carolina, and Virginia as by the Green Mountain recruits and Yankee militia.

The common people, therefore, out of their own love of liberty, and on account of their great courage and energy, contributed much to the success of the Revolutionary war.

Fifth Step.—Other battles of the Revolution may be called up and measured upon this standard of energy and patriotism as shown by the rank and file of troops. Take for example, Bunker Hill, Stony Point, The Cowpens, Saratoga, and others. It is sometimes said that a few men, especially Washington, bore the burden of the war. How far were the spirit and energy of the common people responsible for the final success? Later in our history, both in time of war and in the enterprises of peace, the striking characteristics of the common people should be studied and their influence upon important events and movements observed and compared with earlier manifestations of the popular will.

This idea can be carried over also into the arena of political and social reform.

Parable of the Tares.

Matthew xiii, 24-31.

Several generalizations are suggested and a few are plainly taught by this parable. The tares were sown in the night, when people were asleep; so wicked thoughts are sown when people are spiritually asleep. The tares have an injurious influence upon the good grain; so bad thoughts and actions exert an injurious influence upon good thoughts and actions. When harvest time comes, the different growths shall be judged by the fruits that they bear, and hence, "By their fruits ye shall know them." The householder seems patient in allowing the weeds to stand; so God seems patient with the wicked people. The notes ordinarily furnished in connection with this parable state that the tares are a poisonous weed; so bad thoughts and actions act like poison in our lives.

These are all truths, however, that, while suggested by the parable, do not express the essence of its thought. They are really subordinate thoughts, and should better be neglected than receive much attention. The plainest truth involved is that a sure reward awaits the good and a sure punishment the evil. And that is the thought that Christ himself presents when he is called upon by the apostles to interpret the parable. However, many a teacher will feel convinced that there is another truth fully involved in the story, by means of which more influence can be exerted upon the child than by this one just named. That is presented through the fact

that the householder commands his servants to let the tares stand with the wheat, because the servants cannot remove the one without injuring the other. This, interpreted, means that in this world, though we would often like to banish evil from among us, we do not know enough to separate it from the good, and if we attempted to do so we should make an abundance of mistakes. Hence, we should let both grow together until the harvest, or until the end of the world; and we should not attempt to judge and condemn people, thinking that we see clearly what is good in them and what is bad. The generalization, tersely stated, would be, "Judge not, that ye be not judged." This is the one chosen to be presented here according to the five Formal Steps. The children are thought of as being at least ten years of age, and perhaps somewhat older. The majority of the questions following, although not all, could be given to ten-year-old children.

AIM—Let us see what Christ meant by his story about removing weeds from the wheat.

1. Have you found weeds in a garden of your own? How were they gotten rid of? Why is that so necessary? Is there any danger to the other plants in so doing? Have you seen weeds growing in grain in the country? Where? In what grains? Is it more or less dangerous to remove weeds from wheat than from your flowers or vegetables in the garden? Why? What, then, does the farmer do with them?

2*a*. Now let us listen to the story that Christ told about removing weeds from the wheat. That was

in Palestine, and the particular weeds he mentioned are called tares. They are said to look very much like wheat. (Read Matthew xiii, 24-31.) (If time allows, at least a portion of this parable could be developed, instead of read.) The children, after hearing or reading the parable, relate the same probably two or three times, in order to see clearly the concrete situation. Proceeding, we say, Why, then, were the servants not allowed to pull up the tares? The chief answer is that in so doing they would root up the wheat, because the tares stand so close to the wheat that one could not be pulled up without injury to the other.

2*b*. Christ's disciples hardly knew what he meant by this story, and they asked him about it. Do you think you can possibly tell what is meant? Let us see. He says that a man having a field of grain may be compared with the kingdom of Heaven. If so, whom might the sower represent? Answer—Christ. And what would the field be? Answer—the world. Who would be meant by the good seed? Who by the tares? When will the harvest be? Who are the reapers?

3. Are there many tares or wicked people in the world? Give examples, as thieves, murderers, etc. Those servants thought it would be wise to separate the tares from the wheat and gather them up; have you ever had the same feeling about the bad people in the world? Have you wanted to do away with the evil and leave only the good? Well, now, suppose you were allowed to separate the good from the bad; if this permission were given you, how

would you go at it? (1) On which side, the good or the bad, would you place Jacob? You remember he deceived his aged father. (2) What would you do with Moses? Remember that he killed a man. How did God regard him? (3) On which side would you place Mary Magdalene? What did Christ think of her? (4) Where would you place the Prodigal Son? (5) Would you regard Judas as belonging among the wheat or the tares? You remember he was one of the disciples, and was trusted by them, although he betrayed Christ later. (6) What would you do with the brother of the Prodigal Son? He stayed at home and worked. (7) What would you do with your friends and acquaintances? Why are you confused in these cases? Once more, Why would not the householder allow his servants to pull up the tares? Answer, They were too near the wheat stalks and too much like them to be separated from them. Does that help you any here? How? Answer, (1) The evil is so near the good that they are both found in one person; (2) The good and bad often appear so much alike that often we are not able to tell them apart. What conclusion, then, do you reach about our trying to separate the good from the bad? But what if we went ahead and decided to attempt it nevertheless? Wrong!! Who, then, will attend finally to this separation? Why are angels chosen for it rather than men?

4. (1) Which verse in the parable most clearly calls for delay in separating the bad from the good? Look them through to see. Verse 30. "Let both grow together until the harvest." Are you con-

vinced that this applies as much to good and bad people as to wheat and tares?

(2) Do you call to mind another verse that brings to mind a similar thought? You have heard it often. It begins with the word "judge." Matthew 7-1. "Judge not." Let us learn these two verses, then, and hereafter when the parable of the tares is called for, you may state its chief thought for us by these two verses.

5. (1) At the close of this talk, Christ said, "Who hath ears to hear, let him hear." Why do you think he said that? What did he want them to hear?

(2) Is it true that people have failed in times past to listen to this teaching? What examples from history show this? St. Bartholomew's massacre, witchcraft, the Jews' treatment of Christ etc.

(3) Have you ever been misjudged yourself? How did you feel about it?

(4) Have you ever misjudged others? How did you feel about it then, when you discovered that you had been wrong?

(5) Have you ever really attempted to stop judging others so freely? ("Who hath ears to hear, let him hear.")

(6) What comforting thought do you find in this lesson? Answer, That we should not be too much discouraged at seeing wickedness allowed to continue. We are taught not to be too impatient over the matter.

CHAPTER XII.

THE VALUE OF TYPES.

THE magnet which lies at the center of every weighty lesson is the *general truth* which is to be worked out and applied. The entire foregoing discussion of the succession of steps in the handling of a *lesson unity* unfolds the growth of a general truth in the mind. A proper lesson unity is a topic which has such an embryo truth in it, and the lesson process follows the growth of the truth in the child's mind up to maturity and fruitage. This elaboration of a general truth involves the complete circuit of mental action from the observation and comparison of particulars up to the clear grasp of the general notion, and back again to a broad and ready interpretation in its light of the varying objects and situations in life.

All the illustrative lessons in Chapters II and XI are examples of the working out and application of such general truths. In irrigation is explained the process by which water from rivers and lakes is brought upon arid lands and utilized. This process, with modifications, is the same for hundreds of irrigating ditches, and presents one of those general truths of agriculture which deserves our attention. In the Battle of King's Mountain the

independent spirit and energy of the common people are exhibited in a striking and successful raid against the English troops. By a close comparison we find this same spirit at Bennington. When we come to expand this truth and interpret other events in its light, as for example, Bunker Hill and The Cowpens, we find this spirit breaking out on many important occasions. In other words, a general truth is strongly suggested by the careful study and comparison of two battles, and this is the chief reason for their elaborate presentation. The study of Minneapolis and the other cities of the northwest was to set forth in clear and unmistakable outlines the general notion of a *trade-center* in lumber and flour. The rule for the addition of fractions, the metamorphosis of the milkweed butterfly, the Golden Touch and national unity illustrate the same centering of a whole lesson unity in a single thought or general notion. How to get at these general truths is undoubtedly the one problem of recitation method.

How far does the study of *types* render us direct aid in the struggle to master general truths? The very word *type* seems to bridge the chasm between the particular and the general. The type itself is always an object, a particular thing, action or process, but in so far as it is a type, it is a representative object, it stands for a whole class, the features of a general truth shine out more distinctly through it than through other objects of the same class. We say that Peter Cartwright was a type of the backwoods, itinerant preachers. Garrison was a type of the uncompromising abolitionists, Asa

Gray, of scientific students, Spurgeon, of Baptist preachers of England, but in the typical or representative man the general truth seems to stand out enlarged, magnified, more forcible and tangible than in the average man in whom it seems to be obscured by dullness or personal defects.

A type, therefore, has all the interest and concrete intensity of a particular or personal and conspicuous object, while at the same instant it displays to the thoughtful person the clear outline of a general truth. This does not appear to the child at first as a general truth, but a little later, by comparisons, it is brought out clearly. If general truths are what we aim at, and if the type points the way to the general truth with greater precision and strength, then why not select the best typical objects as the centers of our lesson unities? But in setting up *types* as the pivotal points in recitation method we are met at the threshold with vigorous objections. Are we trying to discover or invent a short-cut from the particular to the general notion? Does not induction require that we study the individuals one by one before comparing and deriving the general notion? In saying that a type is both particular and general are we not throwing into confusion our whole inductive plan? How can a child see a general notion in a single object before others have been brought to his notice? Of what value is the step of *comparison* if the type idea in a single object is so significant?

The answer to these questions and objections may reveal to us more definitely than any other

means the practical and modified working of the inductive process in dealing with the new forms of truth as they arise in children's minds.

It must be confessed that the study of a type is a short-cut toward a general truth, but it is an abbreviation of the process which the trained scientific, as well as the untutored mind, inevitably takes.

A child first makes the acquaintance of its own *father* through a multitude of successive daily experiences, revealing many sides of his character. A little later in meeting other fathers in the neighborhood he is inclined to project this familiar notion of his own father into these other fatherly characters. Certain it is that he does not make a second, third, and fourth elaborate study of neighboring fathers and then sit down and patiently compare them in order to discover the type idea. The dominant notion in the child's mind is the idea of his own father, and this is modified from time to time by the incidental experiences met with in the neighborhood. Even the strict and exact scientist in collecting his data for later ultimate comparison and conclusion, projects his previous experience into every new experiment, avoiding errors and accelerating his observations by a constant reference to previous knowledge. The ornithologist, who studies the stomachs of birds to determine the character of their food, moves up gradually to his final conclusion, comparing each new specimen, in part at least, with the average of his previous data.

Strict systematic induction *i. e.*, a careful observation of one specimen or example after another and

a later comparison, is almost never followed in the young student, and is only realized by the mature scientist. Only one or a very few objects are carefully observed, and a quick observation and comparison of a much wider field of similar objects is sufficient to set forth the general truth. Indeed we can not afford the time for a full and elaborate study of many specimens of a class. If we can find the time for a careful scrutiny of one or two oak trees, we can afford to take a swift or cursory glance at other oaks. For the average student this is all that can be expected or desired.

And yet a clear general notion can not be reached without comparison. A number of similar objects must be brought together, and their differences and likenesses distinctly marked. It is only in this way that the generic properties can stand out as the basis of a general notion. It would be a waste of time to give a detailed description of more than one city in the northwest like Minneapolis, or of more than one irrigating ditch in the west. A very much briefer account of other lumbering cities and other irrigating ditches, with the distinguishing characteristics and differences, serves all the purposes of comparison.

We can not fail to observe that some objects are very much better types of the class to which they belong than others. Minneapolis is a very striking type of the lumber and flour city. The milk-weed butterfly is a conspicuous common species of butterflies. Daniel Boone is almost a perfect type of the backwoodsman and Indian fighter. The Hudson is

a remarkably clear and majestic type of our navigable rivers. Daniel Webster is our preëminent orator, much more distinctly so than Calhoun or John Quincy Adams or Sumner. Mount Shasta is a remarkable type of extinct volcanoes. Study it in the elaborate monograph by J. S. Diller, and make the brief comparisons he suggests with other volcanoes and you have an excellent treatise on volcanoes, and get a fine appreciation of the general truths which they all illustrate. Study the life of Samuel Adams in Hosmer's biography. You become intensely interested in a man of peculiar force of character. The scenes in Boston in which he figured as a controlling spirit are among the most picturesque and important events of the eighteenth century. Looked at from the standpoint of a personal history it is as thrilling and instructive as one of the great novels. But compare Samuel Adams with three or four other prominent characters about Boston, Governor Hutchinson, James Otis, John Adams, and John Hancock and you will get at the very nucleus of New England history during that most stirring period. After such a comparison you will see that Samuel Adams stands forth as the representative Puritan leader of New England, the acknowledged type and embodiment of the spirit which animated thousands of lesser Puritans.

For all the practical purposes of life we must content ourselves mainly with the study of such types. We have neither the time nor the strength to study all the Adamses in equal detail, to say nothing of all the Smiths and Browns. We simply can not enter

into the details of all the important statesman, volcanoes, rivers, cities, or butterflies. Good teaching in most studies depends first of all upon a careful selection of a few best types. Instead, therefore, of spreading our attention over a great multitude of facts, we pick out a few important centers. Around these we gather a large body of facts; we trace out the causal relations of the central type object to its environment and finally we discover by comparing it with other similar things that it is the representative of a law which repeats itself in thousands or scores of other cases. It stands at the head of an army of facts all of which obey the same command.

But nearly all objects and phenomena in nature are essentially typical in their deeper-lying characteristics. How, then, may we select among objects all of which are types? Even if all objects were equally typical of the classes to which they belong, it would be a necessary economy of effort to pick out and make a careful study of a few, with later comparisons, in order to get a quick and sure mastery of the many. But objects differ greatly, as noted above, in their typical or representative power. The value of any type as the principal basis of a lesson unity (be it an event, a person, or a natural object) lies in the strength and reach of its representative qualities. The sunflower is a much more striking type of compound flower than is the wild aster or even the dandelion. The Colorado river is the most conspicuous type of cañon-making streams. For mature minds at least, Shakespeare is one of the few best poets for study, because of the preëminence of

the cardinal poetic qualities in him. And among the masterpieces of any great author some are more typical than others. Among the Waverly novels, for instance, Ivanhoe gives the most vivid and realistic pictures of feudalism which Scott delights so much in portraying. In selecting the complete masterpieces of literature for regular use in reading classes we can not be satisfied with anything less than the best typical poems, essays, and speeches of our American and English masters.

Some trees in the forest strike their roots deeper into the soil, spread their branches wider and tower higher than their fellows. This is far more the case in human life and history. Some men project their influence throughout whole nations and stand forth noticeably as representative leaders of millions of their fellow citizens. Emerson in his *Representative Men* has shown clearly that their power lay in their ability to absorb into their own lives the great typical ideas and impulses that were abroad among their fellow men. This simplifies history. It is only in this way that we feeble mortals can grasp the meaning of large, complex, political, and social phenomena. We see the essential features of a widespread movement incorporated into the striking personal traits of a Gladstone or Luther and what was before complex and obscure flashes forth in a simplicity which the commonest intelligence can grasp. Some men have not only towered above their contemporaries but have wrought an influence so colossal and so typical as to over-shadow centuries and even thousands of years in the lives of great

nations. Such were Homer, Moses, and Aristotle.

In all our preceding chapters we have had opportunity to see the variety and importance of general truths in different studies. In our present discussion we discover that these general truths clothe themselves, to a large degree, in striking types. Pedagogically considered, these types should stand at the entrance to the important avenues of truth in nearly every study. This fact will be of great service to us when compelled to face the problem of selecting those topics in each study which contain the best lesson unities. This problem is now upon us in American schools. We are now sifting out and measuring up the school branches more thoroughly than ever before. The whole question of relative values of studies and of the comparative worth of different topics in a study is distinctly before our schoolmasters. The presumption of our present discussion is that the key to the interpretation of this problem will be found in the selection of types.

Summing up the answers to objections against the use of types, we may say: The well selected type is a short-cut in the inductive thought-movement from particular to general. But it is a short-cut which not only children but even scientific thinkers are compelled to take. The well-chosen type is a combination of the particular and the general, the graphic elements of the concrete being mingled with the striking features of the general notion. To disengage this general notion and bring it clearly into the light a comparison of several similar objects

with the type is necessary. This is the natural and necessary method of abbreviating the inductive process. Without confusion, therefore, the type combines the two fundamental elements of all clear thinking, first the concrete basis and second the outline or index of a general truth.

In surveying some prospective field of study, as grammar or geography, before approaching it with children for purposes of conquest, shall we look upon it as a simple accumulation of facts, as a dead level of equally important truths, like so many hills of corn in a field, all to be cultivated with equal care, or as a few central truths to be completely mastered and applied? Is the field of knowledge like a field of ripened wheat, swath after swath of which is leveled by the sturdy reaper till all is laid low? We know that machines have been made to do this kind of monotonous, mechanical work even better than the sturdiest human arms. But the healthy acquisition of knowledge (in spite of its labor and partial drudgery) is not much like this monotonous level of mechanical effort. As one surveys a field of study he discovers that some facts are more important, ten-fold, a hundred-fold more important, than others. The field of knowledge resembles a mountainous district rather than a plain. To get the broadest views one must climb the highest ridges and summits. The knowledge embraced in any branch of study is not to be considered as a miscellaneous accumulation of facts, nor even as a well-ordered but monotonous series of facts, to be simply memorized or stored away; but it is a field

of conquest which can be best brought under control by taking possession of its strong, strategic positions.

When the Prussians invaded France in 1870 they did not scatter themselves broadly over the whole of eastern France, stopping to plunder every village, city, and hamlet, but they concentrated their armies upon a few of the great frontier fortresses, till they had fought and forced them into surrender. When Strasburg and Metz and Sedan were taken, they had a firm hold on eastern France. They then turned the march of their converging hosts upon Paris, the citadel of France, with results which approved their wisdom. The reduction of the less important towns and districts was accomplished at their leisure.

In a similar way we should plan the conquest of a field of knowledge. As teachers, therefore, there is laid upon us the necessity, before entering upon the conquest, of surveying the field and of selecting the strategic points (the lesson units) upon which we will concentrate our forces.

It is interesting, by the way, to notice what masterly qualifications this implies in the person who lays out the series of lesson topics in a branch of study. It implies a mastery of the subject far beyond what is commonly regarded as a knowledge of its facts. Facts must be sifted out, their relative worth and rank determined. The types must be chosen which are most important in their individual influence and in their representative character. A review of the types worked over in Chapters II and

XI will show that any given type is important for two reasons; first, because it stands deeply rooted in a large environment of facts, which find in it a central, controlling idea, and second, because of its representative quality, by which even in this deep setting of environing facts it proclaims the characteristics belonging to a large class.

It may be stated as a general proposition that most of our lesson unities will find their embodiment in these types. But as all objects are more or less typical and as every study contains ten times as many topics, all typical, as can be properly treated in school exercises, the necessity for a choice becomes apparent. It is customary to compromise this difficulty by spreading effort equally over the whole body of facts, in geography, for example; but this is like the farmer trying to cultivate a thousand acres when he has just force enough to cultivate properly a hundred. Some types are many fold more important than others, both in their root connections and in their exhibition of generic qualities. This is shown above by numerous examples. Children often spend as much, if not more, time in learning some trivial fact as in the effort to grasp some event whose deeper meaning spreads light far and wide throughout a whole subject. Such a fact, interpreted in its causal relations and seen in its representative character, may swing the intelligence into the track of some universal law, as of gravitation or of evolution. Examples of this preëminence of certain types may be found in many studies. The oak tree is such a type among trees and vegetation,

the beaver among animals, the silk worm or butterfly among insects, Mt. Washington and Pike's Peak among mountains, the Mississippi among great rivers, Livingstone among explorers, Bismarck among statesmen, Darwin among scientists.

Certain events in history stand out as landmarks. The year 1787 records a number of important events, among them the meeting of the constitutional convention at Philadelphia. At the time it probably attracted much less attention than our last presidential election. But consider what a tree was there planted, what a growth it has since had, and how it has spread its branches over a continent. The constitution then adopted not only brought into union and harmony the demoralized and antagonistic governments of the thirteen colonies, but determined beforehand the framework of new commonwealths as they have sprung up in rapid succession. Politically, we have been living for more than a hundred years in the house which they built. We elect our governors, judges, congresses, and presidents at the time and in the manner which they specified. The constitution has been of unmeasured influence upon our history for more than a century and will continue, in all probability, to augment its influence for centuries to come. We pride ourselves also that it has been the type of popular, democratic governments the world over. It has been the model upon which other free, representative states in South America and Europe have been constructed. In other words, in studying the work of the federal convention, we are dealing with a few of the funda-

mental principles of government in their preëminent type, the constitution of the United States. The meeting of the constitutional convention is an event of such transcendent importance, the causes which led up to it are so deeply rooted in the early history of the colonies, it brought together so many of the wisest heads of the time in great deliberate council, and the influences that have flowed from it are so vast, that we can afford to spend more time upon it than upon any other single event in American history. Other so-called important events of 1787, as compared with this, are insignificant.

The meaning of such an event lies in its deep generic quality and in its wide-reaching causal relations. Such a topic is a citadel of strength in historical study. It can not be adequately surveyed in a single recitation. It will take many recitations to gather up and focus the necessary tributary facts, to organize them around the central event. But when it has been properly done, a view-point has been gained from which we may rationally survey and interpret a large extent of otherwise unrelated events.

Now it is evident that if so much time is given to the extended treatment of such an important event, a corresponding amount must be subtracted from the time now given to a number of lesser topics. It may mean that the selection and adequate treatment of such types involves the expulsion, as topics, of a host of minor events. But many of them will reappear in their proper setting as secondary to the main topics. It is clear that such a full handling of

central types is based upon a rigid ranking of events according to their true value.

The concentration of effort upon such topics, with their related material, enables us to ground our work upon those natural laws of association upon which memory and reason rest. The links which bind together such a large complex of facts are the ideas of *similarity* and of *causal relation.* The body of facts contained in any given study needs to be organized around a few centers, which thus reduce a large and intricate collection of data to comparative simplicity, and put it under easy control. Just as a city in the midst of a productive and populous region, by means of its numerous radiating lines of traffic, centers in itself the collection and distribution of products, so an important type, by its representative character and causal relations, centralizes and organizes a large accumulation of facts, and leaves thought free to issue forth in every direction from this stronghold, working its interchanges along the great traffic lines of association.

The selection of the important, typical lesson unities in a study will be found later to pave the way for the solution of two large problems which the teacher is sure to meet—correlation and scientific arrangement.

In the very process of careful selection and elaborate treatment of a type we meet unavoidably this *correlation,* or close interrelation of studies. In treating the Hudson river as a type we come upon the mountains, forests, water power, and manufacturing of its upper course; the navigation, cities, railroads,

and scenery of its lower course; its commercial connections by canal with the coal fields of Pennsylvania, with the forests of the north by canal to Lake Champlain, with the Great Lakes by the Erie canal along the Mohawk to Buffalo. The harbor and city of New York, and their easy connections with the Great Lakes and the Upper Mississippi Valley, are on one side, with the Atlantic coast and the marts of Europe on the other. Historically, the Hudson is very attractive; Hudson and his early exploration and his contact with the Indians, the first Dutch settlers, Washington and his campaigns along the Hudson, the old forts and battle scenes, Arnold and André, Burgoyne's invasion and its attendant battles and strategies. In literature, Irving has made certain spots on its banks as famous as the old battle grounds. These stories our children use in their regular reading lessons. From a purely scientific standpoint, the great drowned river valley, its palisades, mountains, and incoming ocean tides are at once suggested.

The moment we begin to treat the Hudson river as an important and typical object in this rich and fruitful way we are certain to run across these relations of the geography to history, literature, and natural science. Not that we are forced in the geography lesson to give the historical or literary or scientific treatment. But the Hudson river as a whole has these historical and scientific and literary facts and associations as well as the geographical. Nor can we dig deep among the geographical facts without running across these root-connections with the

other studies. It is just at this point that the problem of correlation must be met and solved, not by mixing and jumbling the studies, but by tracing in each study these deeper relations to others.

So long as geography study consists in locating and learning the names of cities, rivers, and mountains (this surface survey of geographical facts), we shall not be troubled with the problem of correlation. But take some large geographical type and begin to turn up the deep, rich fund of detailed knowledge involved in it, and at once this strong network of deep and important relations between studies is encountered.

Not only is there an important collection of geographical facts (physical, commercial, industrial, and political) all firmly linked together by strong causal relations, but, naturally included within the same area and explained by this very environment, are the scientific, historical, and literary facts which cannot be kept out of sight. They are all bound up together in one great picture or panoramic view in the very setting in which nature and the growth of human society have put them.

The object of correlation is not to invent or fix up relations between studies, but simply to see facts and objects in those natural and necessary relations in which they actually stand and without which they have no meaning. The concentration of study upon an important type is the choice opportunity for getting into a nest of these naturally correlated facts. The superficial survey of facts in a branch of knowledge and the strict isolation of studies from one

another are the teacher's artificial method of excluding life and meaning from studies.

Such types are not at all difficult to find in geography, history, natural science, and literature. The itemized, connected life history of an oak through its years of germination, growth, fruit-bearing, and final decay, is a close study of the tree in its relations to minerals and soils, of the physical and chemical processes in the tissues, bark, and leaves, of atmospheric and climatic condition, of insect and bird life among its branches, and of the clouds and sunlight above its head. The oak tree as a botanical specimen is rooted and all its parts live in the close environment of the other sciences. Here are several sciences in such intimate relation that no absolute lines of distinction can be drawn. Practically, however, there need be no mixing or confusion of sciences because the central topic is a purely botanical one and puts the other sciences under tribute only to the extent that they can help to understand the important phases of the tree's life.

But this typical object, standing in this environment of closely-related facts, towers above them, and teaches still higher truths, setting into prominence those larger scientific classifications and laws which interpret the phenomena of nature and of human life on a broad scale. Looked at from the standpoint of botany, the full study of the oak brings out a great type of vegetable growth. The type idea, when clearly revealed by comparisons with other trees and vegetable forms, not only stands as the representative of forest trees, easily observed by all

children, but illustrates similar processes throughout all forms of vegetation. Even a child may thus wake up to the presence of great, universal laws, closely observed in a few typical cases, but easily detected in many others. The elaborate study of types is, therefore, the best approach to scientific classes and principles.

Isolate one of these type objects, tear it loose from its root connections, and it is no longer a type. Its deep setting and intimate vital relation to environment constitute a share of its typical character. As the oak tree, uprooted by the storm, lies dead, no longer a type of living forces, so a lesson topic loosened from its natural setting has no life, no vital force as educative material.

In summarizing the points of value in type studies we may note:

1. The type furnishes us a center around which to collect the materials for induction in the first four steps.

2. The type is extremely concrete while strikingly characteristic in its exhibition of generic qualities.

3. The deepening of the type study uncovers those radical relations between studies which give a real meaning to the term correlation.

4. The general classes and truths, which the types prefigure, constitute the scientific framework of the study and at the same time furnish the nuclei for lesson unities capable of treatment according to the five steps of instruction.

CHAPTER XIII.

THE RELATION OF THE FORMAL STEPS OF INSTRUCTION TO TEXT-BOOKS AND THEIR USE.

THE discussion of the Formal Steps as related to text-books is a discussion of a carefully-planned theory of instruction as related to prevailing practices in teaching: for our text-books are a fair index of our methods of class-room work. The common practice is not so good as that suggested by the average of our text-books, and yet the standard set up and generally recognized as attainable is that of our better class of such books. So indispensable are they in our prevailing methods of instruction that any plan which ignores them will be regarded as purely visionary. It is, therefore, quite important to see clearly the relation of the formal steps to the use of text-books.

First let us see the chief utility of these books. The text-books indicate, at any given time, what knowledge is regarded of most value to children, in what order and connection it should be studied, and in a broad, yet definite way, the method by which it shall be acquired. The value of text-books lies in their helpfulness to teachers and pupils. Containing, as they often do, the results of ripest experience in able teachers, they embody such a selection and

arrangement of leading topics, such a correct statement of truths as every teacher needs. They give to both instructor and pupil that systematic body of thought which forms the framework of each study. As the text-books in a study, like arithmetic, are worked out by different teachers, gradually a consensus of opinion settles upon a definite body of knowledge, which becomes the recognized standard in that subject. When the teacher takes charge of a class with such a book as a text, she knows almost exactly what is to be accomplished in the term. She has a task almost as definitely laid out as the plowing of a ten-acre field, and can estimate closely the time required. In most good schools old enough to have traditions, we know with precision what is meant by a term's work in history, in arithmetic, in grammar, or in geography. Custom and the text-books have fixed it.

The advantage of such well-established, authoritative text-books is seen, by contrast, in the absence of such standards. When the teacher has no such text-book and no well-arranged body of knowledge of his own to take the place of it, he has no coherent method of procedure and the work is a failure. Moreover text-books are regarded not only as an indispensable help and guide for teachers but also as the chief instrument by which pupils can be brought to their tasks, to the mastery of their own difficulties. For seat-work and for home-study the text-books are indispensable. In the life of most pupils the text-books play an important role. In the schools as they are, it is largely the business of

teachers to assign lessons and to hear them recited, and of pupils to learn lessons and reproduce them. So universal is this dependence upon text-books that most of our teachers would be at a loss to know what to do without them. If placed suddenly, as was Pestalozzi at Stanz, in charge of a school without books and apparatus, they would be helpless. A very important fact to be remembered is that most of our teachers have had no special preparation for teaching. It would be different if they had acquired such a mastery of each branch of knowledge, before attempting to teach it, as to be lifted above a close dependence upon one book.

I have thus stated the present use and importance of our text-books, to show not so much the contrast in method between the formal steps and the text-books as the situation in which teachers are actually placed. I wish to define clearly the relation in which the method of instruction discussed in the preceding chapter stands to the best use of our text-books.

In Chapter I it was shown that our text-books are almost unanimous in giving a strong emphasis to general truths, which are identical with the *fourth* of the formal steps. The *fifth* step, also, application, is rigorously enforced in our text-books of arithmetic, grammar, and to a large extent in reading and language. The *second* step, or presentation of individual facts, takes up a large share of the geographies, histories, and science studies. We have, therefore, in our present school books and in our widespread methods of teaching a recognition of several of the

most important principles which we have discussed under the caption, Formal Steps. The chief point of difference between the prevailing method of instruction as exemplified by text-books, and that recommended in the five steps, may be easily pointed out. The text-books are essentially deductive and dogmatic in presenting truth; the five formal steps are expressly inductive and Socratic. The distinction between these two methods is not absolute, but relative, for text-books commonly have a sprinkling of inductive processes, while the formal steps at one point (the fifth step) lay great stress upon deductive thinking. (See Chapter VIII.)

Moreover, the inductive method of acquiring knowledge is one that cannot be reduced easily to text-book form. We have indeed text-books in Latin, history, and language which assume to follow an inductive process, yet it is a method which, while it can be illustrated, cannot be fully carried out in a text-book. Such a method worked out in full would make our text-books as big as dictionaries, and so the teacher, in most topics, must be left largely to his own resources in working it out. The Socratic Dialogues of Plato, with their elaborate inductions, are examples of the detail with which a single truth is worked out. As this is impossible with the many truths of one of our text-books, the teacher must be left largely to his own resources in the treatment of his topics. But the inductive method requires relatively few such elaborately treated subjects. It assumes that the teacher has originality and thinking power and is not simply an instructor

by rote or by imitation. The prevailing text-book method begins with the dogmatic statement of all the principles, laws, and facts that are to be learned. The inductive method, on the contrary, collects and compares its concrete data and keeps the mind at work upon these facts till the general truths can be formulated.

This distinction between the two methods is one which is easily kept in mind and will give us the best point of view from which to compare their relative merits and discriminate in detail between them.

It is, therefore, in the first, second, and third steps that the inductive treatment of topics is clearly distinguished from the usual dogmatic form of our text-books. In detail these characteristics of the inductive method may be briefly stated as follows:

1. It sifts out, brings together, and focuses upon the new topic those familiar experiences of the children which have significant relations to that topic.

2. It lays greater stress upon the clear and even graphic presentation of the concrete facts. It not only enlarges the descriptive detail upon any given object, but it multiplies examples of the same truth before leaping forward to general conclusions. The teacher needs a much larger accumulation of concrete data than the book supplies, and a definite skill in handling it.

3. The pupils are called upon to do more thinking, to trace out and explain causal relations, to raise questions themselves and interpret facts by their relations, as this larger material accumulates.

4. Definite comparisons are set up and the points of resemblance and difference, upon which laws and classifications are based, are clearly made out. The outcome of such comparisons is an index finger pointing toward a general truth. The text-books are chiefly blank on these pages. They, with overweening kindness, sum up the whole matter (often before there is much to be summed up in the minds of the children) and give the final result, but do not point out the long route traveled over to attain the result.

5. The stimulus which keeps the children alert in this self-active thought-movement is the aim set up, the question, whose answer is eagerly sought by the children. Every lesson should work toward the solution of some definite problem, and the concrete data are collected and examined for the purpose of finding this solution.

We have noticed above that the text-books neglect to a large extent the first three steps. It is also true that some of the texts, especially history and reading or literature, seldom make a clear statement of the general truth to be worked out. The fables sometimes do this and occasionally the history states a general principle. It frequently happens also that the geographies, histories, science books, and stories make no reference to the actual application of the truth, that is, to step five. In other words, the text-books in most cases fail to bring out distinctly either the steps of induction (1, 2, and 3) or those of clear statement and use of the general truth. In view of this fact and of the fact that all of these steps are necessary to the full

fruitage of knowledge, the great value of the formal steps to teachers is apparent. It shows them where to enrich the text-book and fill out its deficiencies. They get the full worth of the book and still supply those steps that have been unwittingly omitted.

The entire inductive process, with its pursuit of clear aims and movement toward general truths, suggests the notion of large *lesson units*, which are important enough to deserve a liberal treatment through all the essential steps of instruction. Here we are compelled to register a second strong contrast of the formal steps, as a method of instruction, to the method of the usual text-books.

The subject-matter of each study, viewed from the standpoint of the formal steps, should consist of large lesson units or groupings of facts, in each of which groups some single idea dominates. This idea or central truth, (embodied at first in some particular or concrete form,) is to be worked out in a lesson unity to completeness and seen in sufficient variety of cases to warrant a general statement. In the discussion of types, in Chapter XII we found striking illustrations of the collection of facts and of the centering of thought around a few of these important truths. In the text-books the general truths involved in these lesson-unities are present, but their superior worth and rank are obscured in several ways. Side by side with them stand a multitude of other facts or truths of far less real value, but apparently of equal rank. These regnant truths of the subject stand disguised as common soldiers when they ought to be uniformed as officers and

moving at the head of whole battalions. In other words, the text-books distribute their force nearly equally over a very large area of facts and truths without much regard to perspective or the relative value of the data presented, not centering sufficiently upon the more important ideas. This is a source of obscurity, and necessitates the brief, generalized form in which the most important things are stated. The assumption of the text-books throughout is that no great amount of illustrative material is necessary to bring out general truths with distinctness. Young teachers are seriously misled by this assumption.

The formal steps call for the exhaustive inductive treatment of a few important truths in any study. This inductive process of the five steps is far too elaborate a piece of method-machinery with which to attack the multitude of truths, little and big, with which our text-books are crowded. If our wheat fields were fenced off into a multitude of quarter-acre lots it would hardly pay to apply the elaborate machinery of a reaper and self-binder to each one. The fields should be large enough to make the use of that kind of machinery most efficient; and so in the studies.

Having observed these points of contrast the practical question is this: Can text-book methods of instruction be improved by modifying them in conformity to the principles of the formal steps? The answer is that they can be so improved. In reviewing the situation as stated above, we find that the primary difficulty, for which no single teacher is responsible, is the fact that the subject matter is

not arranged into suitable lesson-unities. The number of topics is too great to admit of proper treatment. But for the thoughtful teacher there is a remedy for these faults which still admits of a liberal use of the text-books. The teacher needs to survey the text-book material judiciously, cull out the more important truths that deserve full treatment and bring the secondary and minor facts into relation to these central points. If necessary, omit some of the less important topics and thus gain time to collect, from other sources, the concrete examples needed for developing the leading general truths. One of the most important conclusions from our entire discussion is that any topic to be worked over by the formal steps must be important and typical enough to receive a full treatment leading up to the unfolding and application of a general truth.

In any case a clear grasp of the simple principles of the formal steps cannot fail to show the teacher how to put new life into text-book material. Any teacher who constantly draws from the children's home experience, from his own reading and larger observation, who sets up clear aims in the class-room and encourages children to the thoughtful working out of their own problems, is working both inductively and deductively.

There are certain places or studies in our school course where this inductive-deductive method of teaching is already finding a full and free development.

It is making the teachers masters rather than slaves of the texts, and is resulting in a much

greater amount of well-directed oral discussion than heretofore. In the nature-study of the first six grades we are in constant need of teachers who can handle their topics orally without putting text-books into the hands of the children. In these lessons a teacher needs not only a mastery of the facts and laws, but skill also in almost pure observational and development work. In such cases the formal steps offer a guide of great value to the teacher. The same demand for first-class oral instruction is met in the early studies of history, literature, and geography in primary and intermediate grades. Between the ages of six and ten the children have not gained sufficient mastery of the art of reading to use the necessary books to advantage; but the stories and other subject-matter are exactly suited to their needs as oral work. A biographical story, as of the Golden Touch, or of Champlain or Columbus, presented orally by the teacher and discussed and retold by the children, illustrates admirably the necessity for oral treatment. Such topics in geography as Minneapolis, the Hudson river, and irrigation, call likewise for an oral treatment. Our text-books for these grades do not contain such descriptions, and, if they did, children could not read them. In sixth and seventh grades the oral instruction plays at present a much less important part, and children are called upon to make more use of books and references in history, geography, and science. In the lower grades we need teachers who can give a more spirited introduction to these studies in oral lessons, and in the upper grades teachers who can

lead the children to greater thoughtfulness in using their books and references to work out for themselves the most important truths.

This means, simply, that we are gradually dispensing with the strict dogmatic forms of text-book instruction as teachers become more fully versed in the knowledge of their subjects, and more skillful in adapting their instruction to the needs of the children. The formal steps are a plan to reduce the treatment of all important topics to a simple, rational basis.

It is evident from the entire discussion that any sudden revolution of our methods of teaching by introducing systematically the principles of the inductive-deductive process is not looked for. It is a labor of educating teachers out of traditional into rational methods. Wherever teachers in training classes, in normal schools and in teachers' colleges, in institutes, and in any meetings for careful discussion, are searching for the simple elements of method, the inductive process of developing general truths and applying them will give them a clear insight into the fundamental law of good instruction.

From the pupil's standpoint this sets up everywhere the problem of self-realization. What he needs is not so much a text-book, as a chance to think and apply the truths which make up the usual text-book, an opportunity to develop and organize them into a body of related knowledge. This is, in fact, exactly what is accomplished in classes where a skillful teacher works inductively. The summaries

and conclusions arrived at in class-instruction, all systematically entered in the student's note book, become a skeleton outline of the subject similar to that of a text-book.

Text-books are always in place when used to review and summarize ideas that have been well developed in instruction.

The text-book is also indispensable as an outline of the subject taught. The children need such an outline, not only for the purpose of guiding them into definite and systematic courses, but also to help out the irregularities of school work. Pupils who are absent often need such a text-book to find out the work accomplished and as a means of recovering the ground lost.

CHAPTER XIV.

THE VARYING APPLICATION OF THE FORMAL STEPS TO THE DIFFERENT STUDIES.

IN trying to lay down uniform principles of method the question naturally arises whether there can be one method flexible enough to apply to all studies and to children of different ages. Teachers are prone to think that such a single method must produce a dull uniformity in the treatment of all studies. On the contrary we claim that the laws of teaching embodied in the formal steps lead naturally to a great variety in the recitation work in different studies. Perhaps the chief reason for this is found in the diversity of general truths or laws worked out in arithmetic, history, geography, etc., and in the wide variety of concrete materials out of which these truths are developed. An examination of the processes of treating these contrasted topics in different studies will show how great is the variety in method coupled with uniformity in fundamental principles.

In geography for example, in such topics as Minneapolis as a trade-center, irrigation in the West, a coal mine, the Rhine river, cotton raising in the South, etc., the chief burden of work is met in the first and second steps where each topic is fully discussed and reproduced by the children. On the

other hand the general truth which is developed in the third and fourth steps can be derived quickly, requiring only a small portion, relatively, of the recitation time. The fifth step may be briefly handled or brought in incidentally in discussing other topics later on.

This emphasis of the second step in geography calls for a definite kind of knowledge and skill. The teacher must know the full concrete details of his subject and be able to present them in a graphic way. In primary, intermediate, and even in grammar grades this abundance of interesting material is peculiarly appropriate to the mental condition of the children and brings into full action the senses and the imagination.

The formal steps, therefore, suggest a decided improvement over our present methods in treating geography topics. The peculiarity of geographical materials is recognized and a corresponding modification of method provided. But even with our present text-books, our methods of handling these topics should be improved, in accord with these principles, so as to increase the illustrative materials and put a livelier meaning into the general statements.

What has just been said of geography is largely true of history. In the history lessons of intermediate and grammar grades there is great need for fulness of biographical particulars and much dramatic and picturesque narrative. In contrast with this requirement our text-books are filled up with general statements, important enough in themselves, but not understood for lack of background and detail

coloring. In history, therefore, as in geography, the formal steps point out the exact spot where the greatest improvement is now called for, namely, in the largely increasing amount of personal, individual narrative material, which should be introduced to give keener relish and clearer understanding of historical truths. For younger children in their first approaches to history, simple and interesting biographies are strikingly suited. The reasonableness of this demand for historical biographies is so generally felt that many of the recent books introductory to history have made this idea the basis of their treatment. In history the time given to comparisons and to the formal statement of general truths is relatively brief, as in geography. This is illustrated in the lessons on King's Mountain, In Unity is Strength, The Settlement at Plymouth, Burgoyne's Invasion, The Invention of the Cotton Gin, etc. Indeed, it may be said that any geographical or historical topic which has been fully worked over in the first and second steps will lead up quickly to a clear understanding of important general truths. No great amount of time, then, need be spent on the third or fourth steps.

And yet, while there is considerable similarity in the treatment of topics in geography and history, the materials of the two studies are so different as to make necessary considerable differences in method. In geography, descriptions prevail; in history, biographical and historical narrative; with due regard in both studies to development methods of instruction.

A third study which may be classed with those just mentioned is nature study. In this, also, the first and second steps largely predominate and absorb most of the recitation time. Here, again, the general truths arrived at in the third and fourth steps may be briefly stated. But the process of treating a science topic in the first and second steps is quite distinct from that in geography and history. In natural science lessons the children are in the presence of the objects of study, and must learn to observe and scrutinize the facts. The skill required of the teacher is not that of graphic description or narrative, but that of guiding the children to a close observation, description, and inference. This is illustrated by the lessons on the milkweed butterfly, where the children observe the outdoor life of butterflies, collect specimens, examine, compare, and draw conclusions as to butterfly life.

These three studies, therefore, natural science, geography, and history, while they agree in giving a strong emphasis to the second step, present a striking variety in the method of treatment suited to the peculiar materials of each study. They harmonize also in abbreviating the third, fourth, and fifth steps; and yet the general truths formulated and applied in the fourth and fifth steps are so widely divergent that a free inventiveness and originality on the teacher's part are always appropriate. The formal steps lay no clamp upon the teacher.

In arithmetic our present methods of teaching place great emphasis upon the fourth and fifth steps, *i. e.*, upon the statement and application of rules.

Generally speaking neither text-books nor teachers spend much time in the inductive solution of problems before stating the rule. Perhaps nineteen-twentieths of the time of arithmetic recitations is consumed in learning and applying the rules. In arithmetic we have, therefore, in present practice, the exact opposite of what we have described in geography, history, and natural science, and this is, in the main, defensible. Even in the proper teaching of arithmetic by inductive methods a much greater amount of time will be spent on the fourth and fifth steps than on the first and second. Our present practice in arithmetic neglects somewhat the inductive approaches to rules. The formal steps call attention to the importance of inductive processes in working up to arithmetical rules.

In the study of formal grammar in the seventh and eighth grades there is also a preponderance of the fourth and fifth steps. The amount of language material already collected in the experience of the children makes it possible to devote the major part of the pupil's time not to the acquisition of new individual facts in language, but to the comparison of facts already in mind, to the formulation of general truths and their application. In developing any language principle in the first and second steps it is necessary to bring together familar language material, but there is no need for description or narrative such as is found in geography and history.

Moreover, in both arithmetic and grammar we are able to work out a somewhat complete and systematic body of thought before completing the gram-

mar school. But in geography, history, and natural science no such complete system is possible. As remarked above, it is necessary in these studies to collect a large body of new and concrete data, and in this lies a large part of the labor and interest of the study. The general truths reached, while extremely important, are not so numerous nor so complete and systematic in statement and arrangement as in arithmetic and grammar. The fact that the definitions and rules of grammar and arithmetic can be definitely developed out of particular data and formulated in logical statements which can then be applied makes the treatment of topics in these studies (arithmetic and grammar) almost perfect illustrations of the inductive-deductive method of instruction.

In reading lessons a close analysis is necessary to show the definite application of the formal steps. Reading has two phases. On the one side is learning how to read, first by mastering the symbols in primary grades, and second by drill in easy, natural, oral expression in all the grades. On the other hand, reading means learning to appreciate and interpret the thought-content of the lessons, the ideas, experiences, and truths embodied in the best reading matter. In short, reading may signify a study of symbols or a study of literature.

The body of knowledge to be acquired in learning how to read appears unsystematic and must be carefully sifted out by the teacher to get at the essential ideas. The work consists largely of learning a set of symbols and of associating with them the already familiar forms of oral language. It in-

cludes also the physical development and exercise of the vocal organs. One of the chief causes of poor reading is that teachers do not sift out the essential ideas in this somewhat miscellaneous body of exercises. While the general truths involved are somewhat fugitive and difficult of formulation, they should be as definitely grasped and stated as possible.

There are certain rules for the spelling and pronunciation of words, for the distinct articulation of vowels, and final consonants, for acquiring natural, conversational tones, for the expression of different feelings and emotions, for emphasis and forcible expression of thought. Some of these, which are of the nature of general rules and directions, we will attempt to give.

1. In reading exercises, let the thought and interest predominate over all formal and mechanical drills. Get the children into the spirit of the selection, and let them learn to read under the impulse of thought and feeling.

The other directions which follow may be converted easily into dry and formal routine. First get the children under the momentum of a strong interest, which predominates throughout and subordinates the more formal exercises to its purpose.

2. Children should read as they talk, when they use natural, flexible tones, instead of a stiff monotone.

3. In getting distinctness, final consonants, the pure vowel sounds, and unaccented syllables need to be carefully watched.

4. Thought can be emphasized in several ways, *e. g.*, by lengthening a word in pronouncing, by stress, by contrasting words or phrases, by gesture or action, etc.

5. One needs to cultivate a quick eye and the ability to grasp whole phrases and short sentences at a glance, so as to get thought and express it properly.

6. The pauses should be determined by the thought, the words of a phrase being uttered together under a single impulse. The punctuation marks should be studied as a help in interpreting thought and as a means of breaking it up into its natural segments.

7. The meaning of new words and phrases should be acquired from the context, rather than by means of formal, memorized definitions.

These general directions do not cover the whole ground but they indicate what sort of definiteness should characterize the teacher's effort. They should be worked out inductively and applied in the class room. In order to show that the art of reading involves principles, it is only necessary to ask, What is the teacher's chief purpose in any given lesson? *e. g.*, distinct articulation or natural expression. If she has no such distinct purpose, her work, lacking aim, will be loose and indefinite and not enough specific progress will be made.

Looked at from the standpoint of the thought and culture-material supplied in reading, there are many truths, historical, scientific, and social which ought to be worked out in reading lessons. Illustrations

of this embodiment of truths are The Vision of Sir Launfal, The Great Stone Face, The Psalm of Life, and Evangeline.

Reading, in both its phases, greatly emphasizes the step of application. It is one of the most directly useful of all studies, first because the ability to read is applied so constantly in most kinds of instruction; and second, because the reading of good books supplies us with the best outfit of social and culture-ideals. The fifth step, therefore, in all reading exercises is doubly important. To apply thoroughly the few rules and principles of oral reading is essential to good school work, and bringing to bear the social ideals derived from reading upon the behavior and upon all the social life of the school is vitally important. The demand for graphic, concrete illustrations in the second step, and for the apperceptive use of familiar experiences in the first step, is strongly felt in all good reading work.

Drawing has its definite principles to be developed and applied. In lower grades, where it is chiefly used as a means of expression, these formal principles do not come out so clearly, but it is from these exercises that inductive materials are drawn, from which to develop consciously and to apply the principles of drawing in the upper grades.

In composition exercises, also, we are under the necessity of working out and putting into practice the principles of thought-division in sentences, paragraphs, topics, and whole essays. The principles of punctuation as a means of division of thought, of spelling as an aid to correct form, and of rhetorical

figures for purposes of more spirited expression, must be brought into a few general statements which will be most helpful in getting the best mastery of the art of composition.

In this brief survey of the school studies we observe that the formal steps are capable of great variety of adjustment to the peculiar subject-matter and needs of different studies. The widely divergent character of the general truths developed, and the still more divergent subject-matter from which they are drawn, are a complete test of the flexibility of any proposed principles of instruction. We find that these simple principles of induction and deduction possess adequate elasticity. They are not a dull, mechanical device for reducing all studies to a uniform method. On the contrary, they not only allow, but require, great flexibility and originality in the teacher. At the same time, there is a fundamental movement, which is the same in all the studies and is the basis of scientific method. But the point to be emphasized is that these principles not only lay requirements upon the teacher, but they are a great help to her, while limiting her to certain ways of teaching; they define the course so clearly, in a large way, as to be encouraging and inspiring. They bring definiteness into the field of teaching, where without them one is lost. They are indispensable as a guide to young teachers, and a strong corrective of poor methods in experienced ones.

Looking abroad, beyond the range of common-school studies, we may find in the kindergarten, in

the high school and university, in Sunday school and pulpit, many places which will still further test the flexibility of this method of instruction in its application to the needs of education.

In what is known as the morning circle of the kindergarten, some truth involved in a story is first presented and discussed and afterwards the idea is worked out in games, occupations, drawings, and in dramatic representations, which give expression to the ideas in a variety of ways and cause the story to touch the essential life of the children from several sides. In this manner social cooperation, the artistic sense and various motor activities receive full encouragement. In these exercises the whole movement from concrete particulars and activities to the generalized form and its sensible applications to child life is worked out.

In recent years inductive processes of Latin and modern language instruction have been successfully applied in high schools. The advocates of inductive methods have had to meet the opposition of powerful and well developed, traditional, deductive methods. Inductive methods are more difficult, requiring greater skill, but in the end they must triumph, because they follow the natural trend in learning. It hardly needs repetition that the modern treatment of the sciences is inductive. In physics, chemistry, zoology, and botany, the method of laboratory experiment, of the collection and verification of data is a method of strict inductive advance from particular facts or experiments, to general laws and their later application and confirmation by new data. In

the elementary science work of the common schools deductive methods are now abandoned by nearly all who discuss the subject.

But the concession that there is one great field of human knowledge where inductive methods of learning are the only ones allowable (in moving toward general truths) is a concession that is fraught with mischief to the whole deductive scheme of handling studies. It will be extremely difficult to prove that the mental movement in grammar or history or geography is in any way essentially different from what it is in natural science. The great improvement in scientific study, which emphasizes the laboratory and inductive method, corresponds exactly to the improvement that is now making in elementary schools by increasing the quantity of concrete and illustrative material used in developing principles in all the common studies.

Sunday school teachers are also becoming conscious of the fact that catechisms, proverbs, and single texts of scripture are barren summaries of religious truth (that is, barren of thought to the child). Like any other kind of general truth, they must be enriched with abundance of life material to give them vitality.

In this chapter we have considered mainly the varying application of the inductive and deductive processes to the different studies. But the formal steps also involve other principles of very great importance. Closely linked with the inductive and deductive processes are the principles of apperception, of interest, of self-activity, of logical sequence in

thinking, of aim-setting, of the selection of types and lesson unities. All of these are involved in the application of the formal steps to each of the branches of study. We may say, in brief, that the inductive-deductive thought-movement furnishes the opportunity for every one of these principles to be put into efficient operation. When properly arranged and adjusted to one another these principles are not antagonistic, but work in harmony. The principle of apperception, for instance, applies to every lesson unity, no matter in what study, and the formal steps make definite provision for the exercise of this principle in each important topic studied. The other principles may be tested in the same way, in each study.

Our conclusion is that the school studies have great variety of materials and of truths to be worked out. But it is the peculiarity of general principles to be plastic so as to fit into a multitude of varying situations. If the formal steps were simply a series of devices they could not be expected to fit widely divergent studies. But to the extent to which they embody the essential principles of knowledge-getting, to that extent they are capable of wide diversity of application.

CHAPTER XV.

CRITICISMS OF THE FORMAL STEPS.

The steps of instruction which have been illustrated and variously discussed in the foregoing chapters, may not be accepted without controversy as the best formulation of educational doctrines. Where they have been proposed and applied to school work they have had to run the gauntlet of a sharp criticism. Before any such plan of selecting and of treating topics can be generally accepted, it should be grounded in psychology and its worth practically demonstrated to the satisfaction of teachers in a large variety of studies. Our present educational practice is based upon traditions and theories which partly support and partly antagonize the principles of the formal steps. We can well afford to examine and test them from both standpoints.

Any well-matured plan based upon psychology and sound theory ought to be an ideal which our practice has only partially attained. Many of the best criticisms, therefore, will be found to be simply practical difficulties which inevitably arise in every effort to gain greater proficiency and skill.

The first criticism which the friends as well as the opponents of any plan of instruction must seriously consider is found in the query, "Is it scientific?"

This question we have attempted to discuss at length in the earlier chapters. The psychology of the individual and general notion, as explained in our books under the head of percept and concept, was laid down in the earlier chapters as the scientific basis of the inductive movement in learning. If there is any one process in mental life upon which the psychologists, as scientific thinkers, are agreed more than upon any other, we take it to be this normal movement of the mind from particular to general, from percept to concept. Moreover, the great educational writers, some of them psychologists of the first rank, Comenius, Locke, Rousseau, Pestalozzi, and Spencer, have given an overwhelming emphasis to this one idea. In addition to this test based upon the psychology of the learning process, we are called upon as teachers of experience to make proof of these principles as applied to the treatment of topics in the several studies. In Chapters II and XI, as well as by numerous examples in other parts of the book, we have given opportunity to apply this test.

It seems improbable that teachers will object to any of the fundamental principles, considered singly, such as sense perception, beginning with the individual and concrete, self-activity in acquiring and in using ideas, apperception, the inductive movement from particulars to generals through close observation and comparison, clear formulation and memorizing of the general truth, the deductive extension of truth acquired to new particulars, repeated applications till proficiency in common use is gained.

But there is a further question, whether we have rightly estimated these various principles according to their relative value, and have found out what are their true sequence and interdependence. This organization of essential principles into a compact plan, flexible enough to be applied to all studies, may well be subjected to close criticism. Even if such a plan is adapted to geography and history, has it equal value for mathematics, reading, and Latin?

In this critical discussion it is not difficult to keep in mind the three principal stages in the mental movement upon which the formal steps are based: (1) Perception, or getting the knowledge of the individual; (2) the inductive process up to the clear statement of the general truth; (3) deduction, or the varied application of the truth to new data. Just to the extent to which we find this movement in learning to be general or universal, we have a scientific basis for method in instruction.

But we naturally resist the proposition to bind ourselves down to any law of instruction. So strong is the instinct toward individual freedom that we will submit to no law unless it is very clear and very imperative. Instead of finding this general law accepted, we shall be met with the unfailing criticism that we are drifting into a hard and close routine. This criticism is based upon the assumption that the teacher is trying to make an artificial mold in which mental action is to run, rather than that the nature and constitution of the mind itself determine its mode of activity. The main question goes back to the previous query, Have we found the natural process? All

will agree that the teacher can not arbitrarily make the process, he can only help to guide the minds of children along the road of their best natural, free expression.

We have a right to resist any arbitrary effort to impose upon us an artificial, dogmatic law of instruction. But having rationally and experimentally worked our way to an understanding of the simple principles of teaching, it is true wisdom and self-mastery to force ourselves in practice to conform to them.

The freedom of the teacher consists not in disregarding the law but in finding it out and obeying it.

If psychologists and teachers have been so fortunate as to find the natural highways of human thought, all this crying out against mechanism and formalism is only so much railing at the laws of nature. The whole question of freedom and originality in the teacher is a question either of obeying the laws of nature in the child life, or of constantly blundering in the effort to be free and original. The teacher must have either an instinctive tact or a conscious insight into the simple laws of mental life and action, or this much-lauded freedom and originality is entirely eccentric and unreliable. That teacher will possess the greatest freedom, versatility, and power in instruction who is most skilful in *obeying the law* which regulates the child's thinking. We are constantly driven back, therefore, to the fundamental question; are we mistaken in our interpretation of the mental movement in children? Have we wisely applied the principles of psychology to method in teaching?

But even if our principles are correct and our interpretation of this general process well grounded, we are still exposed to the danger of countenancing a dull routine. The formal steps, like any other plan of recitation work, may be reduced to a mechanical form, destitute of life. There is no protection against this kind of routine except in spirited and earnest teachers. A well-grounded process in teaching will not save the teacher who lacks knowledge of his subject, who lacks insight and tact in managing children, or who is destitute of spirit and originality. In other words, the teacher must throw the whole strength of his personality into those channels which a wise method has laid out, or else failure is sure. We can easily expect too much from formal principles and plans of instruction. They are valuable as a means of economizing and of concentrating the teacher's energies within the best channels. The tacit assumption always is that a teacher pours his own versatile and vigorous spirit through these channels. Without this the form of instruction is like a dry millrace, empty and powerless. It may be admitted that an active-minded, independent teacher will feel hampered, for a time, in the attempt to apply the formal steps of instruction. Any one not accustomed to their use, whether a beginning or an experienced teacher, will apply them more or less mechanically at first, before they fall into easy unconscious use. But just as a young pianist gradually overcomes awkwardness and self-consciousness in following the directions dictated by the principles of music, so the teacher can expect

to free himself gradually from the feeling of constraint, and in the easy use of these principles of the formal steps find a means of power.

Another criticism against the method of instruction under discussion is that it *increases the load of the teacher*, while it *reduces the amount of independent effort required of the pupil.* This criticism, if true, strikes a fatal blow at the whole method. There is, indeed, an appearance of justice in this criticism. The teacher is required to show greater skill in presenting topics (in the second step), more power to illustrate and explain, more insight and tact in calling out the experience and older knowledge of children (first and second steps), greater precision and aptness in questioning and in developing general truths (in second, third, and fourth steps), a more complete, logical mastery of the principles of the subject taught and their various applications. All these things are necessary to first-class teaching, and where the teacher has not yet acquired this sort of professional knowledge and skill, these requirements are indeed a heavy burden.

But most persons will acknowledge that these requirements are just. The teacher must assume the obligation of a larger mastery of his subject and of a readier proficiency in class-room treatment. In this we are simply setting up a standard to which teachers are encouraged to rise, and which lays upon them the burden of professional equipment.

But there is another side to this difficulty. That which at first glance seems only a heavy burden becomes later an inspiration and easement. Having

once acquired professional knowledge and skill, the teacher will find his work becoming less mechanical and burdensome, more spirited and engrossing. The feeling of conscious power, based on previous success, becomes an exhilaration, and the teacher moves up to a larger freedom and capacity for instruction. Instead of the cramping influence of a narrow routine, he feels the expansive energy of a clear and generous purpose working in practical ways. The criticism against this so-called overburdening of the teacher loses its point when we consider that the outcome of a mastery of these principles of teaching and of their skillful use means economy of effort and the inspiration of success.

But the more important question is, what effect has our method upon children; does it make thinkers and workers, or does it produce lassitude and easy-going habits of study?

It is sometimes supposed that the more skillful and efficient the teacher and the method, the less the pupils have to do. Just as if we had forgotten the underlying purpose of all study, to produce the greatest vigor of self-activity in the pupils. The essence of all good teaching is to stimulate thoughtfulness and self-effort in the pupil. Even where the teacher in the second step presents or illustrates topics, his purpose is to awaken thought and to secure close attention, and to increase the labor of the pupil.

Whatever is thus presented by the teacher must be appropriated and reproduced by the pupil. Much greater vigor of attention and effort can be secured under the eye of the strong teacher in the recitation

than in isolated seat work where the pupil may dawdle as much as he pleases.

The recitation itself is one of the best places in which children can be trained into habits of keen and close attention. But so far as possible the habit there formed should be strengthened by similar exertions in seat work and in home study. The main question is, where and how can the teacher bring his personality to bear upon a child in such a way as to induce strong and vigorous mental action. Our answer would be that it depends upon the manner in which the teacher handles his subjects in the class room. If he knows how to interest and intensify intellectual and will power in the recitation, the seat work and the home study will fall into line. In other words, it is a question of method in the recitation.

Some children will probably learn how to concentrate their powers if left to themselves with books, but most pupils need the presence of the vigorous and incisive teacher to give them their tempo in intellectual action.

Equally important with this habit of concentrating attention is the ability to think logically and and independently. We want self-reliant thinkers. The Socratic method of discussion, while very difficult, is the only one that can lead to this result.

Throughout the general inductive process (first, second, third, and fourth steps) a careful scrutiny will show that a child is constantly thrown back upon his own resources in observation (sense perception), in the resort to home experience and previous knowledge (apperception), in the careful statement

(reproduction) of all facts observed or presented in the class, in making comparisons, and in the statement of general truths which are formulated by the children themselves. The underlying purpose of all this work is to arouse vigor of thought and self-exertion on the part of the pupils.

It is an extremely superficial and perverted view of this process therefore to call it a method of making study merely easy, entertaining, and non-laborious to children. Mental effort should always be tense, not loose and flabby. Undoubtedly it requires skillful teaching under any circumstances to produce this kind of sturdy, self-reliant effort. But we shall certainly not solve the problem by allowing the teacher to abdicate his position and his duty as a skillful leader in the class-room and to roll the whole burden and responsibility upon the pupil by saying that he must learn the entire lesson before he comes to the class.

The teacher is more than a simple task-master, and his function as a task-master should remain in the background till other and better means of stimulus fail.

It is the business of the teacher to economize effort for the children as well as for himself; to get at truth by the shortest route, along the line of least resistance. We need not be frightened by such a statement. There will be plenty of difficulties to call out their powers, numberless tasks in which they can work out their own salvation. One of the great problems in the use of coal and electricity is to reduce the waste, to economize by utilizing the

highest percentage of power. So in mental operations.

There is a great folly in wasting a child's effort upon some problem which he is not ready for, when the teaching has been so blundering as to bring him against a difficulty he is not prepared to meet. One reason why we have to help children so much is because of our unnatural methods of bringing them unprepared into difficulties. If we lead children along according to the natural law of thought, they will solve their own difficulties, become independent thinkers. If we ignore the laws of teaching, we have to step in frequently to extricate them from their difficulties. Ease of movement is a good thing. If all our school work is encumbered with the heavy drag of toilsome effort, *i. e.* of effort put forth merely to overcome needless friction, it becomes terribly depressing.

One of the most serious obstacles in the way of introducing such a class-room method as we have proposed, (including spirited oral work, presentation of topics by the teacher, and a Socratic mode of question, answer, and statement by children) is the fatal tendency, with many teachers, of allowing this process to degenerate into a waste of time, an aimless and inadequate treatment of topics. The awkward and abortive *development lessons*, too often observed, may easily lead us into a condemnation of inductive methods of teaching.

The old-fashioned text-book work, in which children learn their lessons and recite them is far better than this so-called development work. But there

is something better than the old verbatim recitation, and it involves the higher power of skillful oral discussion of topics in the recitation. The fact that so many of us are clumsy in teaching inductively and at least partly by the developing method is no sufficient reason why we should not set up for professional attainment that method which has most highly recommended itself to the good sense of the best thinkers and teachers. We have many teachers to-day, especially in primary and intermediate grades, who are so expert in the oral treatment of topics that they could not be induced to return to a duller method. All the great writers on education, Comenius, Locke, Pestalozzi, Spencer, and Mann, have condemned the purely deductive method of imparting general truths dogmatically in elementary schools. In all schools and institutes, therefore, where teachers are in training, it is needful that inductive methods of study be cultivated, illustrated, and applied.

Still another criticism has been raised, on the ground that the inductive methods of teaching do not lead to such a *thoroughness* and *mastery* of the subjects as deductive teaching and formal drills. One of the strong points in the education of the past, which has been chiefly deductive, was the thoroughness of its discipline through drills and repetitions. At least such has been the strong conviction of its friends. It is incumbent upon the inductive processes of teaching to show a superior kind of thoroughness; not only that looseness and shallowness are not the necessary fruitage of inductive methods,

but that a thoughtfulness, a careful assimilation of knowledge, an organic building-up of thought-masses, results, which gives the best sort of thoroughness and mastery of studies.

In schools where the formal steps have been systematically worked out and applied, such thoroughness has been one of the main results aimed at. It shows itself especially in the power to use what has been learned. In Chapter VI, where the acquisition of particular notions is treated, and in Chapter VIII, on the application of general notions, there was an unusual and varied emphasis of this perfect mastery. In addition to this we may evidence the fact that in closing up the work of the second and fourth steps, careful and thorough reproductions and drills are held to be an essential part of this plan of teaching. At these two stations we can afford to stop and summarize the results of study. These are the two points where a thorough knowledge of the individual notions (second step) and general notions (fourth step) is rendered indispensable. Careful repetitions and drills and systematic ordering of facts and principles are insured first by oral exercises in the class, and secondly by clear and logical outlines and full written statement of principles and rules, in a blank book carefully kept or in the text-book form.

But in addition to these important stations on the recitation-road, specifically devoted to careful fixing of ideas, there are two other places in which the final complete mastery of knowledge is tested; namely in the apperceptive use to which all our

resources of knowledge and experience are put in the first step, and in the *applications* which are so completely worked out in the fifth step.

Oral and written examinations are, in many cases, invaluable tests of the mastery of subjects by the pupils. They are frequently the best means at the teacher's disposal for testing the ability and knowledge of a class. The deliberate answers given by pupils to carefully worded questions furnish the best means of estimating the thinking power, as well as the store of facts gathered by pupils.

The greatest difficulty which lies in the way of a psychological procedure in teaching, which is adapted to the needs of the children and to the materials treated, is the whole *traditional method* of instruction now in vogue. No one teacher or group of teachers is responsible for this. The plan which commonly prevails of allowing children to prepare their lessons at their seats, and come to the recitation to recite, the prominence of the text-book with its brief statement of facts and principles and the rigid dependence of teacher and pupils upon it, the emphasis put upon testing and examining by teachers—all these things are matters of long-established custom, and are firmly rooted in the habits and convictions of our teachers of all grades of excellence. The plan of recitation which we propose runs counter in important points to these traditional methods. It calls for much greater mastery of the subject taught, a closer acquaintance with the children's experience, greater skill in instructing, and more shrewdness and ability in throwing the children

upon their own resources and self-activity. It is a plan for developing greater tact, originality, and expert skill in every phase of instruction. For this reason it can not be accepted at once by all teachers. It calls for too great a change from routine methods to methods based on clear insight and skillfully applied.

A misconception that needs to be carefully guarded against is that every recitation should show the full treatment of a topic through the series of five steps. On the contrary, it is seldom that a single recitation will reveal the treatment of a subject in this complete series. Frequently it requires one or several recitations to handle merely the second step of a lesson unity. Sometimes the application of a principle (fifth step) will require the whole recitation period or more. The unit of measure is not the time of a single recitation, but the central truth to be worked out and applied in a lesson unity.

Another misconception is that any given method-whole (or lesson-unity) must be worked out completely through the five steps before another method-whole is taken up. On the contrary, it will often happen that one method-unity will be carried through the first and second steps, and then dropped for a while, other unities being treated in the interval. Later on new examples or data illustrating the first unity come up for treatment, and comparisons are made with the earlier lesson-unity, which lead on to the statement of a general truth and its further application.

If, for example, the children have studied the Upper Mississippi as a lumber stream, other topics, as the Great Lakes, the Ohio Valley, Niagara Falls etc., intervening, they will later come upon the lumber streams of Maine, and make comparisons with the Upper Mississippi as to the mode of collecting and distributing lumber, and draw a larger general truth from it than was possible with the Mississippi alone.

In history likewise, the children have studied the Battle of Bennington long before they read of the Battle of King's Mountain. Many other topics have come in between these two events. But when King's Mountain has been described it is a fitting time to make the comparison with the Battle of Bennington (third step), and lead on to a statement of that common spirit which animated the patriots in both these battles (fourth step), while still later conflicts of the Revolution and of the Civil War, may furnish the best applications of the same idea, (fifth step.)

This conception of the free use of the formal steps, according to the necessities of the study, and of the particular topic under treatment puts the teacher under no narrow compulsion and removes the necessity for cramping any lesson in an artificial method-scheme.

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